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Boston, Mass. 02203

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# Environmental Impact Statement

Draft

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# Local Wastewater Management Program N. Branford, Connecticut

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# ENVIRONMENTAL IMPACT STATEMENT

## LOCAL WASTEWATER MANAGEMENT PROGRAM

## NORTH BRANFORD, CONNECTICUT

This Draft Environmental Impact Statement evaluates wastewater collection and treatment alternatives for North Branford. The major recommendation is for a limited sewer system to serve the Foxon area of the community.

Futher information on this statement can be provided by:

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MAY 28 1979

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for William R. Adams, Jr.
Regional Administrator
Environmental Protection Agency
Region I

Final Date by Which
Comments on the Draft
Must Be Received

# TABLE OF CONTENTS

PAGE

## SECTION 1.0 - SUMMARY

1.1 General Discussion.......................... 3
1.2 Federal and State Programs.............. 3
1.21 P.L. 92-500............................ 5
1.22 Construction Grants Program............. 5
1.23 PRM 78-9............................... 6
1.24 1977 WPCA Amendments................... 6
1.25 State Program and Responsibilities...... 7
1.3 Local Involvement....................... 8
1.31 Town Plan of Development............... 9
1.32 Town Sewer Plans....................... 9
1.33 Environmental Review Process........... 11
1.4 EIS Work Program....................... 12
1.41 Issues................................. 12
1.42 Public Participation Program........... 15
1.421 Newsletters........................... 15
1.422 Questionnaire......................... 16
1.423 Workshops............................. 17
1.43 General Data Collection................ 18
1.44 EIS Field Work......................... 18
1.441 Windshield Surveys.................... 19
1.442 Connecticut DEP Survey................ 19
1.443 Follow-up Survey...................... 20
1.444 Water Quality Sampling................ 21
1.5 Overview of Analysis of Alternatives.......................... 25
1.51 General Alternative Concepts........... 27
1.52 Potential Impacts of Alternatives.......................... 27
1.53 Screening of Alternatives.............. 28
1.54 Conclusions............................ 29

## SECTION 2.0 - PURPOSE AND NEED

2.1 Precipitating Action.................... 33
2.2 EIS Findings............................ 33
2.3 EIS Recommendations..................... 33

# TABLE OF CONTENTS (Cont'd)

PAGE

## SECTION 3.0 - ALTERNATIVES INCLUDING THE PROPOSED ACTION

3.1 General Discussion of Alternatives...... 37
3.2 No Action.............................. 37
3.3 On-Site Solutions...................... 37
3.31 Changes in Use of the Existing Septic Systems.......................... 38
3.32 Repairs to Septic Systems.............. 39
3.33 Expansion of Existing Systems.......... 39
3.34 Replacement of the Leaching Field....... 39
3.35 Site Modification/Curtain Drains........ 40
3.36 Mounded/Pumped Systems................. 40
3.37 Summary................................ 41
3.4 Local Sewer Systems.................... 41
3.5 Town-Wide Sewer System................. 42
3.6 Development of Alternatives for North Branford......................... 43
3.61 Problem Areas.......................... 43
3.62 Alternative Concepts................... 47
3.63 Foxon Area Alternatives................ 48
3.631 Foxon Alternative A - Continued On-Site................................ 49
3.632 Foxon Alternative B - Community System................................. 49
3.633 Foxon Alternative C - Limited Sewer System.......................... 49
3.634 Foxon Alternative D - Full Sewer System................................. 49
3.64 Green Acres Area Alternatives.......... 53
3.641 Green Acres Alternative A - Continued On-Site...................... 53
3.642 Green Acres Alternative B - Sewer System.......................... 53
3.65 White Hollow Area Alternatives......... 55
3.651 White Hollow Alternative A - Continued On-Site...................... 55
3.652 White Hollow Alternative B - Community Systems...................... 55
3.653 White Hollow Alternative C - Limited Sewer System.................. 55
3.654 White Hollow Alternative D - Full Sewer System..................... 55

## TABLE OF CONTENTS (Cont'd)

| | | PAGE |
|---|---|---|
| 3.66 | Potential Impacts of Alternatives....... | 59 |
| 3.661 | Public Health.......................... | 59 |
| 3.662 | Aesthetics............................. | 59 |
| 3.663 | Potential Habitat...................... | 59 |
| 3.664 | Future Water Supply.................... | 60 |
| 3.665 | Wetlands............................... | 60 |
| 3.666 | Existing Habitat....................... | 60 |
| 3.667 | Farmland............................... | 60 |
| 3.668 | Planned Development.................... | 60 |
| 3.669 | Economic Growth........................ | 60 |
| 3.6610 | Community Character.................... | 60 |
| 3.6611 | Cost Effectiveness..................... | 60 |
| 3.6612 | Conformance with PRM's................. | 61 |
| 3.6613 | Local Acceptance....................... | 61 |
| 3.6614 | Future Provisions...................... | 61 |
| 3.6615 | Ease of Management..................... | 61 |
| 3.6616 | Individual Expense..................... | 61 |
| 3.67 | Cost Effective Analysis................ | 61 |
| 3.68 | Public Attitudes....................... | 61 |
| 3.7 | Preferred Alternatives................. | 64 |
| 3.71 | Foxon Alternative A - Continued On-Site................................ | 64 |
| 3.72 | Foxon Alternative B - Community System................................. | 65 |
| 3.73 | Foxon Alternative C - Limited Sewer System........................... | 65 |
| 3.74 | Foxon Alternative D - Full Sewer System................................. | 66 |
| 3.75 | Green Acres Alternative A - Continued On-Site...................... | 66 |
| 3.76 | Green Acres Alternative B - Limited Sewer System................... | 66 |
| 3.77 | White Hollow Alternative A - Continued On-Site..................... | 67 |
| 3.78 | White Hollow Alternative B - Community System...................... | 67 |
| 3.79 | White Hollow Alternative C - Limited Sewer System.................. | 67 |
| 3.710 | White Hollow Alternative D - Full Sewer System..................... | 67 |

TABLE OF CONTENTS (Cont'd)

PAGE

SECTION 4.0 - AFFECTED ENVIRONMENT

4.1 Natural Environment.................... 71
4.11 Topography/Hydrology.................... 71
4.12 Geology/Soils.......................... 72
4.13 General Water Quality.................. 79
4.14 Climate............................... 81
4.15 Air Quality........................... 81
4.16 Sensitive Ecological Systems........... 82
4.2 Human Environment...................... 83
4.21 General Land Use....................... 84
4.211 History............................... 84
4.212 Patterns.............................. 85
4.213 EPA Resource Inventory................. 89
4.22 Land Use Regulation.................... 90
4.221 Water Company Lands.................... 91
4.222 Zoning................................ 92
4.223 Wetland Regulations.................... 96
4.224 Floodplain Regulations................. 97
4.225 Agricultural Preservation.............. 101
4.3 Growth & Development................... 103
4.31 Population Projections................. 103
4.32 Local Plan of Development.............. 105
4.33 Regional Plan.......................... 107
4.34 State Plan of Conservation & Development............................ 110
4.35 Local Perceptions of Growth............ 113
4.4 Characteristics of Resource Use........ 114
4.41 Water Supply........................... 114
4.411 General............................... 114
4.412 New Haven Water Company................ 116
4.413 Water Quality.......................... 118
4.42 Wastewater Disposal.................... 121
4.421 Past and Current Practices............. 121
4.422 Continuing Limitations................. 122

## TABLE OF CONTENTS (Cont'd)

PAGE

SECTION 5.0 - ENVIRONMENTAL CONSEQUENCES

5.1 General Discussion........................ 125
5.2 No Action........................ 128
5.21 Future Development Scenario............. 129
5.22 Impacts on Water Resources............. 131
5.221 Public Health........................ 131
5.222 Future Water Supply........................ 133
5.23 Impacts on Natural Systems............. 134
5.231 Wetlands........................ 134
5.232 Existing Habitat........................ 134
5.24 Impacts on Human Resources............. 135
5.241 Farmland........................ 135
5.242 Planned Development........................ 136
5.243 Economic Growth........................ 137
5.244 Community Character........................ 137
5.3 Town Proposal & Concept for Foxon Area........................ 138
5.31 Impacts on Water Resources............. 139
5.311 Public Health........................ 139
5.312 Future Water Supply........................ 140
5.32 Impacts on Natural Systems............. 141
5.321 Wetlands........................ 141
5.322 Existing Habitat........................ 142
5.33 Impacts on Human Resources............. 142
5.331 Farmlands........................ 142
5.332 Planned Development........................ 143
5.333 Economic Growth........................ 144
5.334 Community Character........................ 145
5.4 Modified Foxon Proposal........................ 146
5.41 Impacts on Water Resources............. 147
5.411 Public Health........................ 147
5.412 Future Water Supply. ........................ 148
5.42 Impacts on Natural Systems............. 148
5.421 Wetlands........................ 148
5.422 Existing Habitat........................ 149
5.43 Impacts on Human Resources............. 149
5.431 Farmlands........................ 149
5.432 Planned Development........................ 150
5.433 Economic Growth........................ 150
5.434 Community Character........................ 151

## TABLE OF CONTENTS (Cont'd)

PAGE

5.5 Green Acres Area Rehabilitation......... 151
5.51 Impacts on Water Resources.............. 152
5.511 Public Health........................... 152
5.512 Future Water Supply..................... 152
5.52 Impacts on Natural Systems.............. 152
5.53 Impacts on Human Resources.............. 152
5.531 Farmlands............................... 152
5.532 Planned Development..................... 153
5.533 Economic Growth......................... 153
5.534 Community Character..................... 153
5.6 Green Acres Area Sewer Systems.......... 153
5.61 Impacts on Water Resources.............. 154
5.611 Public Health........................... 154
5.612 Future Water Supply..................... 154
5.62 Impacts on Natural Systems.............. 154
5.621 Wetlands................................ 154
5.622 Existing Habitat........................ 155
5.63 Impacts on Human Resources.............. 155
5.631 Farmland................................ 155
5.632 Planned Development..................... 155
5.633 Economic Growth......................... 155
5.634 Community Character..................... 156
5.7 White Hollow Area Rehabilitation........ 156
5.71 Impacts on Water Resources.............. 156
5.711 Public Health........................... 156
5.712 Future Water Supply..................... 157
5.72 Impacts on Natural Systems.............. 157
5.721 Wetlands................................ 157
5.722 Existing Habitat........................ 157
5.73 Impacts on Human Resources.............. 157
5.731 Farmland................................ 157
5.732 Planned Development..................... 157
5.733 Economic Growth......................... 157
5.734 Community Character..................... 158

## TABLE OF CONTENTS (Cont'd)

PAGE

5.8 White Hollow Area Community Sewer....... 158
5.81 Impacts on Water Resources............. 158
5.811 Public Health.......................... 158
5.812 Future Water Supply.................... 159
5.82 Impacts on Natural Systems............. 159
5.821 Wetlands............................... 159
5.822 Existing Habitat....................... 160
5.83 Economic Growth........................ 160
5.84 Community Character.................... 161
5.9 Conclusions............................ 161
5.91 Foxon Area............................. 161
5.911 Impacts Which Cannot Be Avoided......... 167
5.912 Mitigative Measures.................... 168
5.92 Green Acres Area....................... 168
5.921 Impacts Which Cannot Be Avoided......... 170
5.922 Mitigative Measures.................... 170
5.93 White Hollow Area...................... 170
5.931 Impacts Which Cannot Be Avoided......... 171
5.932 Mitigative Measures.................... 171
5.94 Areawide............................... 172

SECTION 6.0 - LIST OF PREPARERS 173

APPENDIX A PUBLIC PARTICIPATION

APPENDIX B WATER QUALITY SAMPLING

APPENDIX C DESCRIPTION & ECONOMICS OF ALTERNATIVES

APPENDIX D DETERMINATION OF WASTEWATER NEED

APPENDIX E BIBLIOGRAPHY

# LIST OF FIGURES

| NUMBER | | PAGE |
|---|---|---|
| 1-1 | Regional Context........................ | 4 |
| 1-2 | Study Area.............................. | 10 |
| 1-3 | Original Sewer Proposals................ | 13 |
| 1-4 | Water Qualtiy Sampling Sites............ | 23 |
| 3-1 | Problem Areas........................... | 45 |
| 3-2 | Foxon Alternative B..................... | 50 |
| 3-3 | Foxon Alternative C..................... | 51 |
| 3-4 | Foxon Alternative D..................... | 52 |
| 3-5 | Green Acres Alternative B............... | 54 |
| 3-6 | White Hollow Area Alternative B......... | 56 |
| 3-7 | White Hollow Area Alternative C......... | 57 |
| 3-8 | White Hollow Area Alternative D......... | 58 |
| 4-1 | Wetlands/Topography..................... | 73 |
| 4-2 | General Limitations for Septic System Use............................. | 77 |
| 4-3 | General Land Use........................ | 87 |
| 4-4 | Zoning.................................. | 93 |
| 4-5 | Floodplains............................. | 99 |

## LIST OF FIGURES (Cont'd)

| NUMBER | | PAGE |
|---|---|---|
| 4-6 | Local Land Use Plan...................... | 106 |
| 4-7 | Regional Land Use Plan................... | 108 |
| 4-8 | State Land Use Area Classification...... | 112 |
| 4-9 | Water Service Area....................... | 115 |
| 5-1 | Environmental Impact Profile............ | 162 |
| 5-2 | Environmental Impact Profile............ | 163 |
| 5-3 | Foxon Interceptor........................ | 165 |

# LIST OF TABLES

| NUMBER | | PAGE |
|---|---|---|
| 1-1 | Partial Questionnaire Results........... | 17 |
| 1-2 | General Water Quality Sampling Programs................................ | 22 |
| 1-3 | Generalized Water Quality Sampling Results................................. | 26 |
| 3-1 | Summary of Costs of Alternatives........ | 62 |
| 3-2 | Overview of Total Impacts............... | 63 |
| 4-1 | Past Population Data for North Branford................................ | 103 |
| 4-2 | Population Projections.................. | 104 |
| 5-1 | Available Land & Anticipated Development............................. | 130 |
| 5-2 | Cost of Modified Foxon Proposal......... | 164 |
| 5-3 | Cost Estimates For Green Acres Sewers.................................. | 169 |
| 5-4 | Cost Estimates For White Hollow......... | 171 |

# SECTION 1.0

# SUMMARY

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The objective of the summary is to provide the reader with all the facts, reasoning, and conclusions of the project in one location. In order to do this, serveral sub-sections were developed. A brief description of the Federal and State programs is presented as basic information for the local citizen/decision maker. North Branford's involvement in these programs and the reasons that led to the EIS project provide additional background. The EIS work program is described in detail to show the understanding of the local project, the approach that was taken and actual work that was done that led to the EIS conclusions. Finally, the alternatives that were examined are presented along with the analysis that led to the ultimate statement of the EIS recommendations.

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## 1.1 General Discussion

North Branford is a Town of about 12,000 people situated in South Central Connecticut about 5 miles northeast of the City of New Haven (Figure 1-1). This Draft Environmental Impact Statement (DEIS) has been prepared to present to interested citizens and decision makers progress of an on-going project which has been examining the nature of North Branford's wastewater disposal problems. The Town has proposed the construction of sanitary sewers with Federal and State grant assistance. The purpose of the DEIS is to inform the public of the preliminary findings of EPA's project team concerning the extent of the problem, the availability of alternative solutions, and the existence of potential environmental impacts that may result.

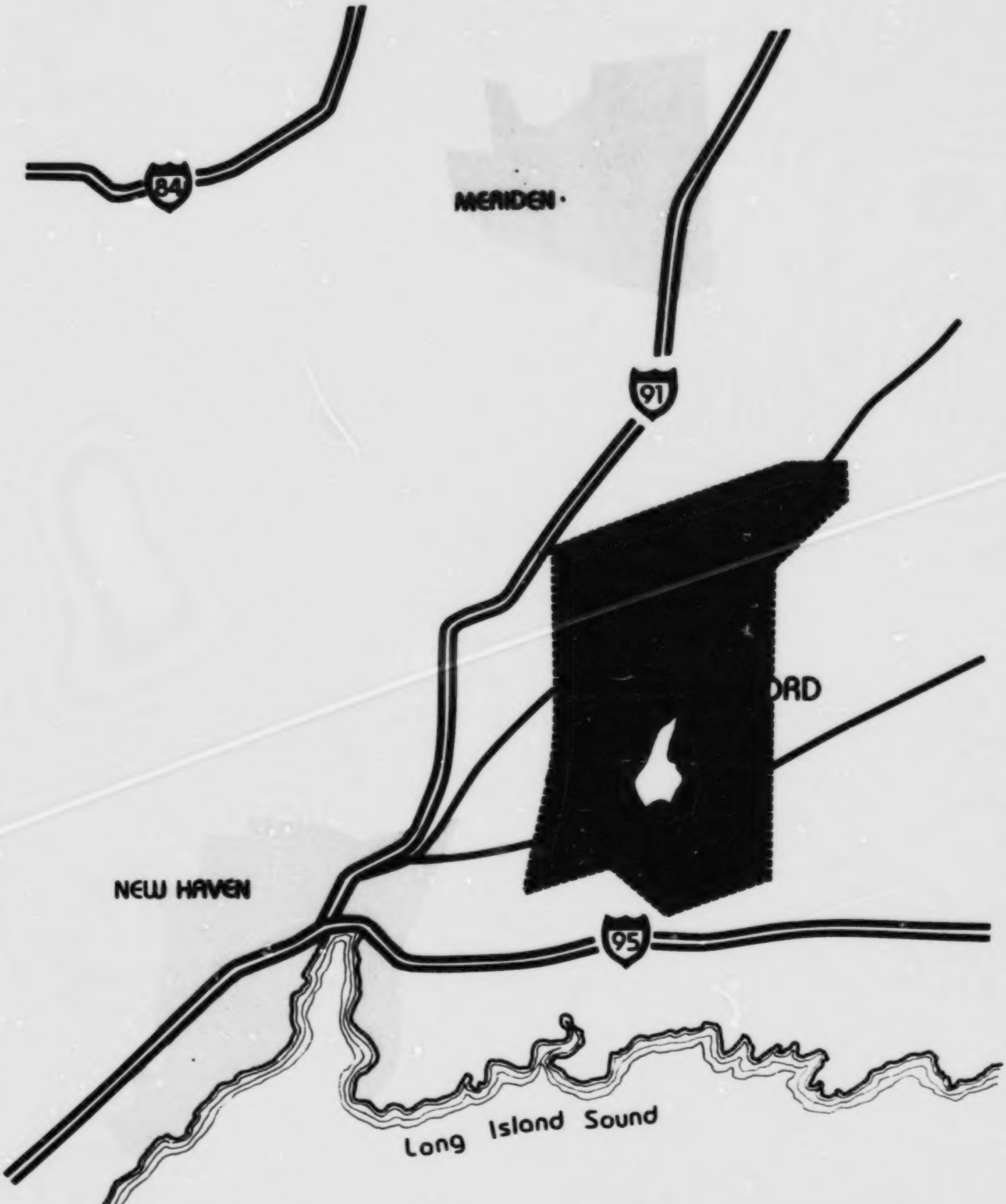
The EIS has concluded that wastewater disposal and pollution problems exist in sections of North Branford. Chronic widespread septic system problems were found in the Foxon Area in the south, in the Green Acres area in the northwest, and in the White Hollow area in the northeast. Smaller areas of localized problems included Jerz Lane, Miller Road, and Grant Drive in the Middle Farm River Valley. Elsewhere, where isolated problems are reported, insufficient population concentrations exist to warrant a group solution.

The EIS recommends EPA participation in the construction of the limited sewer project in the Foxon Area. In the north part of town, in Green Acres and White Hollow, the conventional sewer concept that has been developed will require further review by the Town. In Green Acres, the system would be feasible but expensive. White Hollow could not be considered for funding of a conventional sewer system due to its environmental impacts. In both instances, a neighborhood-scale sewer system or an on-site rehabilitation program may be feasible, however, and is worth further study.

The sections that follow present the context in which the original sewer project developed and the course of action followed in the preparation of the EIS.

## 1.2 Federal and State Program

The following Federal and State programs are relevant to this EIS:


84
MERIDEN
91
ORD
NEW HAVEN
95
Long Island Sound

regional context figure 1-1

north branford wastewater treatment facilities

date: february 1979

source: anderson-nichols & co.,inc.

environmental impact statement ■ environmental protection agency

anderson-nichols & co., inc. technical consultant

## 1.21 P.L. 92-500

On October 17, 1972, Congress enacted the Water Pollution Control Act Amendments of 1972 (PL 92-500). The objective of the Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Specific goals of the Act include the elimination of the discharge of pollutants into navigable waters by 1985, an interim goal of water quality which provides for the protection and propagation of fish, shellfish and wildlife and provides for recreation in and on the water by 1983. To achieve these goals, Title II of the Act authorizes the Administration of the U.S. Environmental Protection Agency to assist in the development and implementation of wastewater collection and treatment plans.

## 1.22 Construction Grants Program

Rules and Regulations, required under Section 201 of P.L. 92-500 promulgated by EPA, established what has become known as "201 Facility Planning". Facility Planning is a three step process that usually results in the construction of a wastewater collection system and treatment facility. The three steps are:

-- Step I - General Planning

-- Step II - Design Drawings & Specifications

-- Step III - Construction

Through its Municipal Facilities Branch, EPA awards grants generally on the order of 75% for "eligible" items of each of these three steps A typical level of effort for each of these steps at a very generalized level, is shown in the following relationship:

-- Step III - Construction, Engineering, & Administrative Costs

-- Step II - Design Costs - equal 10% of Step III

-- Step I - General Planning Costs - equal 10% of Step II

By law, the Facility Plan must analyze a number of alternatives for the solution of water pollution problems, through a process that includes public participation, and select the most cost-effective and environmentally sound alternative. To accomplish this end, the facility planner is required to prepare an environmental impact assessment report along with the engineering analysis.

## 1.23 Program Requirements Memoranda

In 1976, an EPA survey of 258 "facility plans" from 49 states reported that 83 of these recommended the construction of completely new collection and treatment systems. For small communities, these new collection and treatment systems represented a high annual cost to individual homeowners. EPA responded, through a Program Requirements Memorandum (PRM), which required facility plans to fully evaluate and analyze:

-- septic tanks, holding tanks and package treatment plants for small clusters of houses.

-- "honey wagons" and septage treatment facilities to serve a group of individual family systems, and

-- new systems serving only individual families.

In June 1977, in a further effort to require the thoughtful planning, EPA Administrator Costle issued PRM 77-8. This PRM required specific documentation of health, groundwater and discharge problems of existing disposal systems and a further documentation of site characteristics which restrict the use of existing disposal systems. Also, PRM 76-3 required public disclosure of the costs of any collection system project including, individual operation and maintenance changes, individual debt service changes and estimated connection costs.

## 1.24 1977 Water Pollution Control Act Amendments

In December 1977, Congress enacted amendments to P.L. 92-500 producing the Clean Water Act of 1977 (PL 95-217). One amendment authorizes grants for the construction of privately owned treatment works serving one or more principal residences or small commercial establishments. These amendments made the selection of alternatives to sewer construction that were to be analyzed under PRM 77-8 (PRM 77-8 with minor modifications has been reissued as PRM 78-9) eligible for Federal funding. Further, the Act authorizes states to set aside funds specifically for the implementation of alternatives to conventional sewers.

## 1.25 State Programs and Responsibilities

In carrying out the EPA grants program, the various states have a significant role. Because the Federal Law provided only certain amounts of money to be allocated to each state, the states have functioned as a clearing house for grant applications and have made decisions which determine which items in a project are "eligible" items and which communities have the greatest needs.

In Connecticut, the Department of Environmental Protection (DEP) has performed this function in conjunction with its own grant program under the Clean Water Act of 1972. This program provides funding of wastewater management projects of 15% of the cost of eligible items. When combined with EPA funds, as much as 90% of the project costs in a community may be paid for by State and Federal Grants.

The actual funds that may be available to a community are dependent largely upon the amount of money that the states has [illegible] to it in a particular year and the priority list which the State established to allocate these funds. Funding for Connecticut amounts to $49.8 million in 1978 and $55.4 million for fiscal years 1979, 1980, and 1981.

These allocations are the yearly amounts for the fiscal years 1978-1983 which became available with the passage of the 1977 Amendments. Similar allocations were made for the period of 1974-1977 under the original Act.

One aspect of interest is that in 1977 when North Branford was applying for funding of its projects, the State had funds from the original Act still uncommitted as the first funding period ended. Operating under the belief that these funds might have to be returned to the Federal Government, the State in an effort to commit all of its funds, extended eligibility to the construction of laterals (local street sewers). Two important results occurred. First, communities who applied received eligibility in the form of actual 90% funding for most costs of their projects. Secondly, the PRM's re-emphasized the requirement to demonstrate need based on water quality degradation, in keeping with the intent of the original legislation that made funds available.

Each year, the State assigns priority to the projects in various communities by means of an elaborate point system which results in a priority list. The communities are in essence competing for limited available Federal funds. Despite the EIS project which is required in the Foxon Area, North Branford has been given assurances because of their application that the funds will be reserved for the action that is ultimately recommended for the area. The EIS has not, therefore, jeopardized the lateral funding that was available for the Foxon Area.

## 1.3 Local Involvement

In the course of developing a background perspective against which the Town's proposal could be evaluated, numerous sources were consulted. These included newspaper clippings, DEP and EPA correspondence files, and local interviews.

One important aspect is the length of time that the sewering issue has been under consideration in North Branford. Correspondence between Town and State officials dates back well over ten years. It appears that the community actively sought State aid in the development of a sewer system, in part at least, as an adjunct to its industrial development plans. As has been frequently stated by the present Mayor, a majority of each of the elected Town Councils has consistently supported this pursuit. The Council that is now sitting, in fact, has presented the EIS project with a written statement in support of sewering. This Statement is included in Appendix A.

During this time period, individual values and goals have undergone significant change. Universal support for "growth" and its presumed attendant economic benefits has given way, in part, to the emergence of "slow growth" advocates. Suburban communities like North Branford have often been the area for conflict between these opposing points of view.

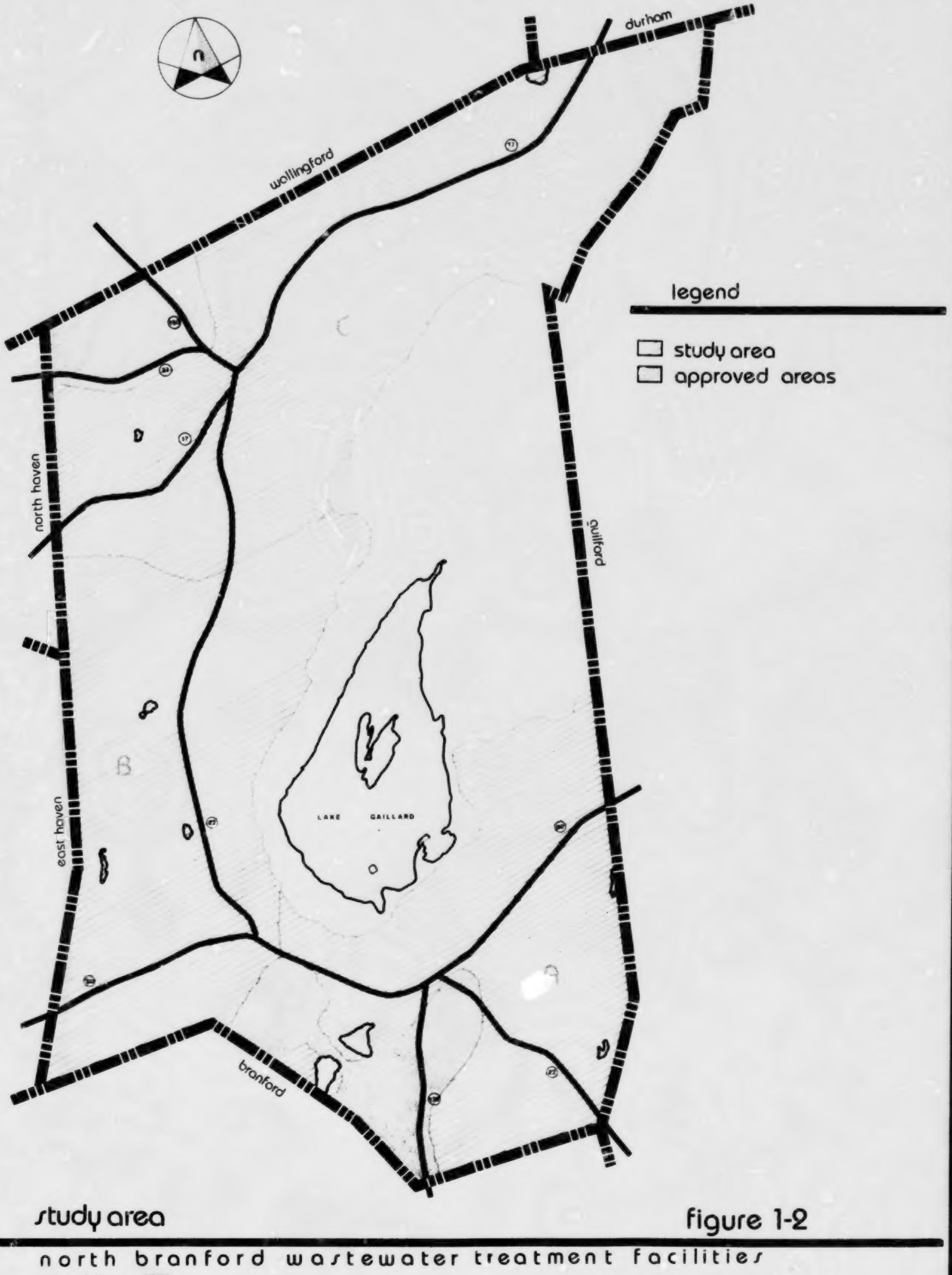
The funding of sewer programs has often been the issue that sparks this type of controversy. As sewers are considered a long term investment, a 50 year planning period was formerly used in their design. Because of the environmental impacts of projects based upon this time dimension, a 20 year design period is now required. The necessity to forecast the future of a community even this far into the future still brings out the differences of the "growth" and "slow growth" philosophies held by different elements of the community.

### 1.31 Town Plan of Development

The Town's only expression of its plan for the future is its 1971 Plan of Development. This document generally assumed the continued pressure for residential development to result in an eventual population of 25,000 people in the year 2020. This would represent a doubling of the Town's present population. The role of sewers as a component in the development scenario is described at a number of places in this report.

### 1.32 Town Sewer Plans

The Town has basically gone through 4 stages in its sewer planning effort. Stage 1 was a 1970 report which concluded that the three natural drainage basins in the town could be best served by transport of the wastewater to three different treatment facilities outside the town itself. It was also assumed that a sewer system would be capable of ultimately serving most of the land area within these basins. The basic interceptors would take wastewater from the North Branford village area (Area A) south to Branford, from the Foxon Area (Area B) west to East Haven, and from the small Muddy River area in the northwestern corner of Town (Area C) west to North Haven (Figure 1-2). Finally, wastewater in the Upper Farm River Valley also (Area C) would be collected and pumped to North Haven. These concepts have been retained through the present Town sponsored plan. (Figure 1-3)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☐ approved areas

study area

figure 1-2

north branford wastewater treatment facilities

date: february 1979

source: anderson-nichols & co., inc.

0 1600 3200

environmental impact statement  environmental protection agency

anderson-nichols & co., inc.  technical consultant

Stage 2 consisted of a series of special studies which refined the plan for serving side streets by lateral sewers. In 1975, the three part town-wide sewer plan was proposed (with the incorporation of these special studies and an environmental assessment of each of the three areas) as Stage 3. In this study, those areas, beyond the initial construction phase which had been originally described as "long range", were revised to show "Phase 2 and Phase 3 construction".

In the final plan, Stage 4, in 1976 the initial sewer construction program (Phase I) was slightly reduced in response to financing limitations that were apparently caused by the general delay of the projects. This Reduced Sewer Program was the Town's proposal for initial construction for which it sought funding. This Proposal and the general Concept are shown on Figure 1-3.

### 1.33 The Environmental Review Process

In implementing NEPA, EPA adopted a formal review process as described in the Federal Register of April 14, 1975. When an action is contemplated, EPA must review the proposal for potential environmental impact and reach one of two decisions. If it is decided that a project will have no significant environmental impact, EPA issues a written statement called a Negative Declaration and the project proceeds. If, on the other hand, it is concluded, that the action will have significant environmental impact and/or create controversy, then a Notice of Intent is issued which announces that an Environmental Impact Statement must be prepared.

In the Spring of 1977, the Town applied for Federal and State grants to construct sewers in Sections A and C. With the issuance of two Negative-Declarations, the Town obtained EPA's approval to construct these two projects. At the same time, the proposal to construct sewers in Section B was also being reviewed. In the Fall of 1977, EPA issued a Notice of Intent which outlined its concerns with this project and announced its intention to prepare an Environmental Impact Statement to assist the agency in making a final decision.

The issues that were identified at that time were:

- -- the demonstration of need for a sewer project
- -- environmental impacts of a sewer project including change of community character
- -- costs to the individual
- -- possible indirect water quality impacts as a result of induced growth within the Farm River Valley

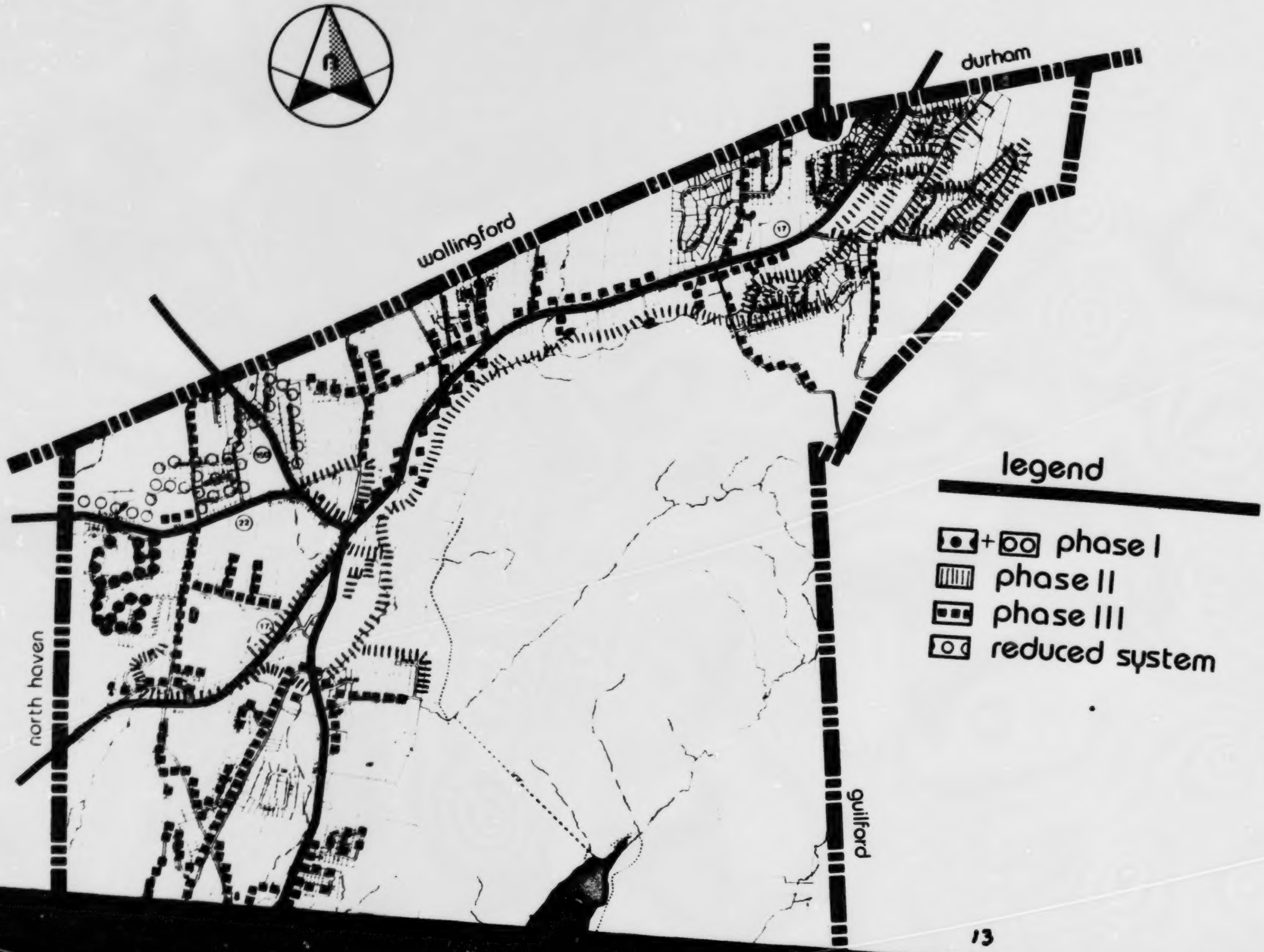
The State in turn postponed taking any action on its order to abate pollution and its grant decision pending the completion of the EIS process.

## 1.4 North Branford EIS Work Program

In response to the environmental issues that were identified in the Notice of Intent, a program for the North Branford EIS was prepared. In addition to the general areas of analysis which are required by the federal EIS guidelines, a number of activities were contemplated specifically for this project. Included were a series of newsletters to announce meetings and inform residents, a town-wide questionnaire to obtain local citizen inputs, a series of workshops to encourage the free exchange of information, a water quality sampling program, and specific engineering field work.

### 1.41 Issues

As the project progressed, the major local issue that emerged was the basic question of whether sewers were needed or not. A large number of residents related their own experience with septic system problems, and their lack of faith in the long term use of septic systems as the basis for their desire for a sewer project. The opposite viewpoint was expressed by a smaller group that was less vocal, awaiting, perhaps, to see the outcome of the EIS. They also questioned the need for sewers in light of their perceived environmental impact and cost.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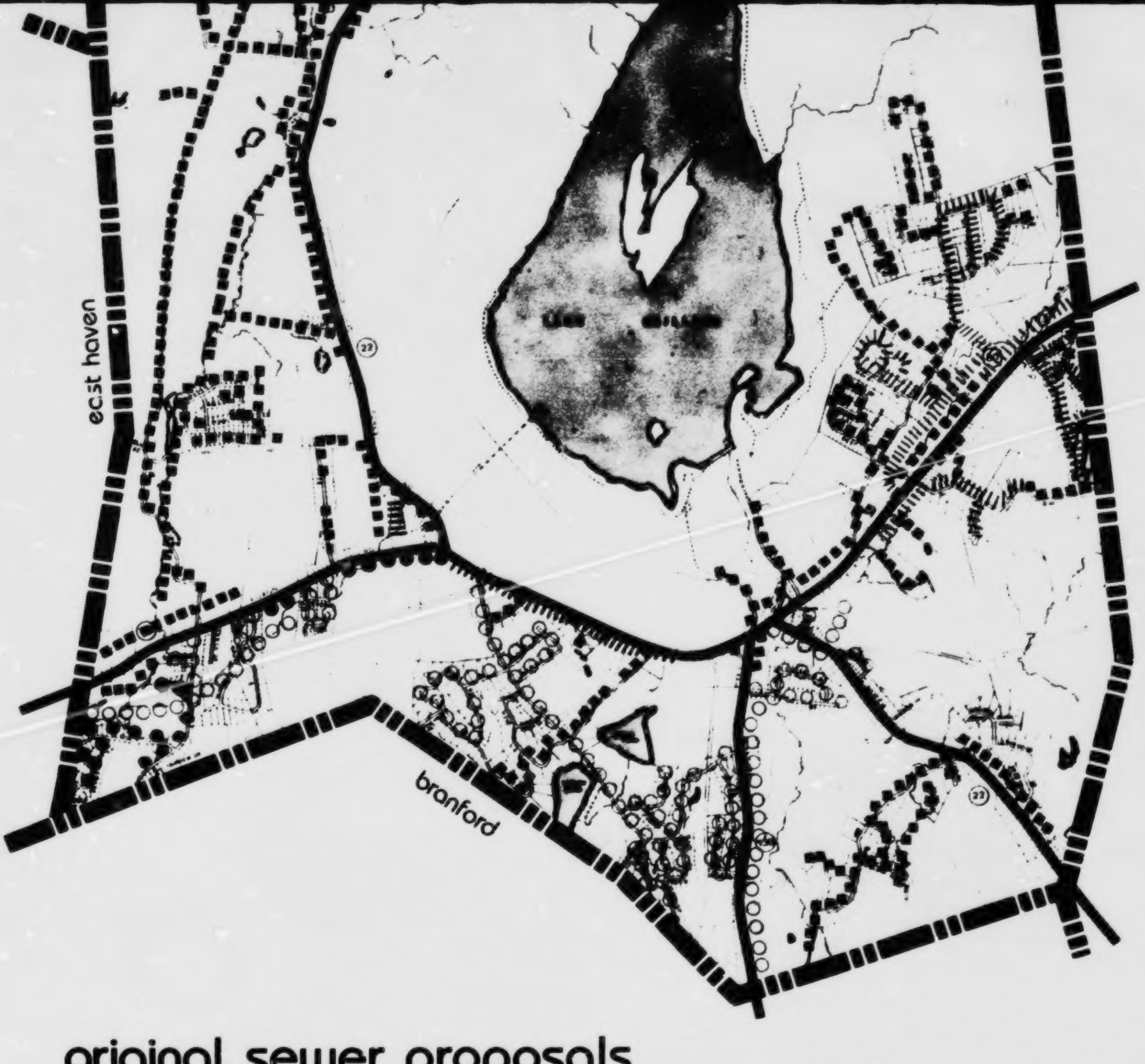
east haven
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branford
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original sewer proposals

figure 1–3

north branford wastewater treatment facilities

date: february 1979

source: flaherty-giavara associates

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environmental impact statement ■ environmental protection agency

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An additional local issue of interest to the EIS team was a public debate and referendum over implementing the EPA and State approved initial sewer program in Area C. As a result of the decision to issue Negative Declarations for the initial sewer program in Areas A and C, the EIS project restricted its study area to that shown in Figure 1-2. Prior to the Town's initiation of construction in the initial C area, north of Clintonville Road, a group of residents circulated a petition calling for a referendum on the question of funding the local share of this project. Approximately 1,000 people voted in this referendum, with a 9 to 1 majority objecting to initiation of the project. A question arose, however, as to the validity of the vote because of a disagreement over the actual number of votes cast. Because the total number is so close to that minimum which determines the referendum's standing, the question has been taken to the courts.

As of this writing, the referendum question is unresolved. There remains, therefore, a group of citizens who strongly opposed the Section C-1 sewer project on the basis of proof of need and cost. Considerable press coverage was devoted to the issue prior to the vote, providing a public forum where the issue of the benefits of development were argued. A description of the EIS effort to include the public in the decision-making process follows.

### 1.42 Public Participation Process

The process carried out in North Branford included the following elements:

#### 1.421 Newsletters

A series of three newsletters were prepared for town-wide mailing for the purpose of generating and maintaining interest in the EIS project and to announce impending workshops. (See Appendix A) They were designed in three distinct bright colors but with a common graphic theme in order to attract attention and develop familiarity with the continuing project. Newsletter #1 was a bright green mailing sent in early January 1978 to explain the scope of the EIS, the participants in the process, and the issues known at that time. It also explained the purpose and mechanics of the first workshop which was held in mid January.

Newsletter #2 was a bright yellow document mailed in early May, 1978. It contained a report on the outcome of workshop #1, interim results of the questionnaire, and reported on the state of the field work. The time, place, and agenda of workshop #2 was also announced.

Newsletter #3 was an orange mailing in early August 1978, which updated the status of the project, identified the range of alternatives under consideration, and explained the benefits and liabilities of each concept. The time, place and purpose of workshop #3 was also announced.

### 1.422 Questionnaire

A questionnaire to obtain information from individual homeowners on the performance of their septic system, and the issue of sewering was mailed in early February. The questionnaire was pre-addressed and carried return postage to facilitate a good return. Arrangements were made to staff a local office for two days to answer questions that residents might have during the questionnaire's circulation. This was announced in advance in the local newspaper.

Despite the blizzard which occurred during the questionnaire period (which tied up the town switchboard due to a declared state of emergency), a respectable return of about 20% was obtained. In order to give residents an additional opportunity to complete the questionnaire, a newspaper article was printed giving a local telephone listing at which a second mailing list was compiled.

Some aspects of the questionnaire response are summarized on the following page in Table 1-1. The complete questionnaire can be found in Appendix A. Responses are discussed in Appendix D.

## TABLE 1-1

## NORTH BRANFORD, CONN. EIS

## PARTIAL QUESTIONNAIRE RESULTS

| Question Content | Yes | No |
|---|---|---|
| Your system a problem? | 23% | 75% |
| Neighbor's system a problem? | 43% | 45% |
| Have system pumped? | 64% | 22% |
| Have had system repaired? | 35% | 63% |
| Sewers needed in neighborhood? | 38% | 55% |

### 1.423 Workshops

A series of three workshops was held in North Branford for the purpose of obtaining input from the general public. The basis of a workshop format is to provide an informal atmosphere where residents can convey information, express opinions and ask questions as the project develops. To accomplish this task, the typical workshop session consisted of a short presentation by the EIS team, a group discussion period, and a general question and answer segment. The discussions were held among groups of about eight neighbors to a table and focused on a set of prepared questions.

Workshop No. 1 was held at the North Branford Middle School in January. Its basic purpose was to obtain information from local residents about their experiences and perceptions of the nature and extent of wastewater disposal problems, both in their neighborhoods and throughout the town.

Workshop No. 2 was held at the same location in May for the purpose of reporting on the EIS project identification of the wastewater problem and a general discussion of possible alternative solutions.

Workshop #3 was held at the Northford Middle School in August. At this meeting, specific alternatives for problem neighborhoods were identified and the costs, anticipated tax rate changes, and costs to individuals were presented.

More information about these workshops can be found in Appendix A. The workshop concept has provided the EIS project team with useful periodic inputs which have become an integral part of the EIS and its recommendations.

### 1.43 General Data Collection

When an EIS is conducted in a community, attention can be focused on specific issues and analyzed to a greater depth than is the usual engineering practice in 201 Facility Planning. Quite simply, the availability of additional time and manpower provides for a more comprehensive review of a problem. The project does, however, logically build on the data base that already exists.

The North Branford EIS team initially collected as much information as it could from Federal, State, regional and local agencies. Included were planning documents from all levels, water quality data, and sanitary survey results. This information provided the general data base that is documented in Section 4.0 against which potential impacts were identified.

While a sincere attempt has been made to "cover all the bases", it is always possible that information has been overlooked. The Draft EIS provides everyone with the opportunity to call our attention to any oversights which may affect the ultimate EIS recommendations.

### 1.44 EIS Field Work

The EIS project conducted original field research in a number of areas. These efforts were an attempt to build on the body of existing knowledge - a benefit of the EIS process. Because this work was conducted under a single comprehensive program, it is believed that a more favorable atmosphere for reasonable judgements was created. It must be remembered, however, that this information must also be evaluated in the light of all previous work. With finite resources, the EIS work alone cannot provide all the final answers.

Field work was conducted basically in the areas of water quality and on-site septic system suitability. All of the dozen or so team members visited the area on a number of occasions not only to obtain specific facts, but also to develop a sense of the general atmosphere of the Town and its neighborhoods. In addition, a continuing subscription to the local newspaper has been maintained in order to develop a "local" perspective against which local issues can be evaluated.

### 1.441 Windshield Surveys

The first windshield survey was made prior to developing the EIS Scope of Work. Subsequent visits included preparation for the informational meeting at the start of the project, refining the water quality sampling program, developing the engineering field effort, and for the general purpose of preparing to write the environmental inventory sections.

All personnel have made several of these general surveys of the community. On every visit to the Town or the general area for specific appointments, time was spent in slowly and systematically observing neighborhoods and noting such things as lot size, house size, slope, drainage, and evidence of wastewater disposal problems. At one time or another, every street in the community has been visited once by both the project manager and principal technical area heads. Most streets have been traversed several times, and many, especially those in problem areas, have been examined many times.

### 1.442 Connecticut DEP Sanitary Surveys

The Connecticut Department of Environmental Protection devotes time and staff, when possible, for the purpose of locating septic system problems in communities. The need for these surveys which identify specific houses with problems arose from past experiences in which local residents asked for documentation that their homes or neighborhoods are actually experiencing problems with their septic systems. Presently, these teams are used on a project-by-project basis at the discretion of the regional engineer when manpower is available.

During the late spring and early summer period of 1978, the DEP was able to survey about 500 homes in North Branford in an effort to assist the EIS project. The teams were sent to streets which were suspected of having problems. They systematically noted those addresses at which problems were detected. Their input provided one more data set which could be integrated with other information to provide a comprehensive basis on which to define the "problem areas". The timeliness of their survey and the data which they could amass, due in part to their ease of entry on private property, provided valuable supportive information.

### 1.443 EIS Follow-up Surveys

In addition to the general field work of the Project Engineer, additional engineering evaluations were provided by a staff member specializing in on-lot wastewater disposal. The problem areas that were identified through the workshops and the questionnaire were visited on a street-by-street basis. Homeowners within these areas were informally interviewed regarding their experiences with their system's performance and their perceptions of wastewater problems and solutions. Observations were also made as to the probable cause, excessive slope in some cases, and possible site problems with respect to rehabilitation. The latter included homes where inground swimming pools or unique landscaping usurped all additional space that might be needed for a new expanded septic system.

These surveys were not intended to identify each and every problem system and the exact nature of the problem. Rather, they were intended to develop information at a neighborhood scale. When combined with the questionnaire results, the DEP surveys, the water quality sampling, and local knowledge acquired through the workshops, this survey information enabled the EIS project team to analyze the feasibility of various alternatives.

### 1.444 Water Quality Sampling

Local rivers and streams were systematically sampled and analyzed as part of a program of evaluating local water quality. The samples were taken at 15 locations throughout the community on four different occasions. The sample locations are shown on Figure 1-4.

Analysis was performed for chemical and biological indicators of septic system pollution. Some of this information is summarized in Table 1-2.

The sampling locations were chosen to provide wide area coverage and to permit discrimination of values upstream and downstream of large developments. The total number of samples and cycles were constrained by budget consideration. The results, however, provide the community with a unique data set as a by-product of the EIS project.

The sampling cycles were conducted in the late spring at about 2-3 week intervals. This was generally coincident with the period of field work. Also, it is generally believed that the wet spring months represent "worst case" conditions - if a septic system is going to have problems, it will likely be during this period of high groundwater.

The results of this effort indicate that the water is neither pristine nor grossly polluted. The actual data contained in Appendix B shows that the water quality varies from place to place and from time to time. This is most likely a function of the two activities that affect local water quality - septic systems and agricultural practices.

## TABLE 1-2

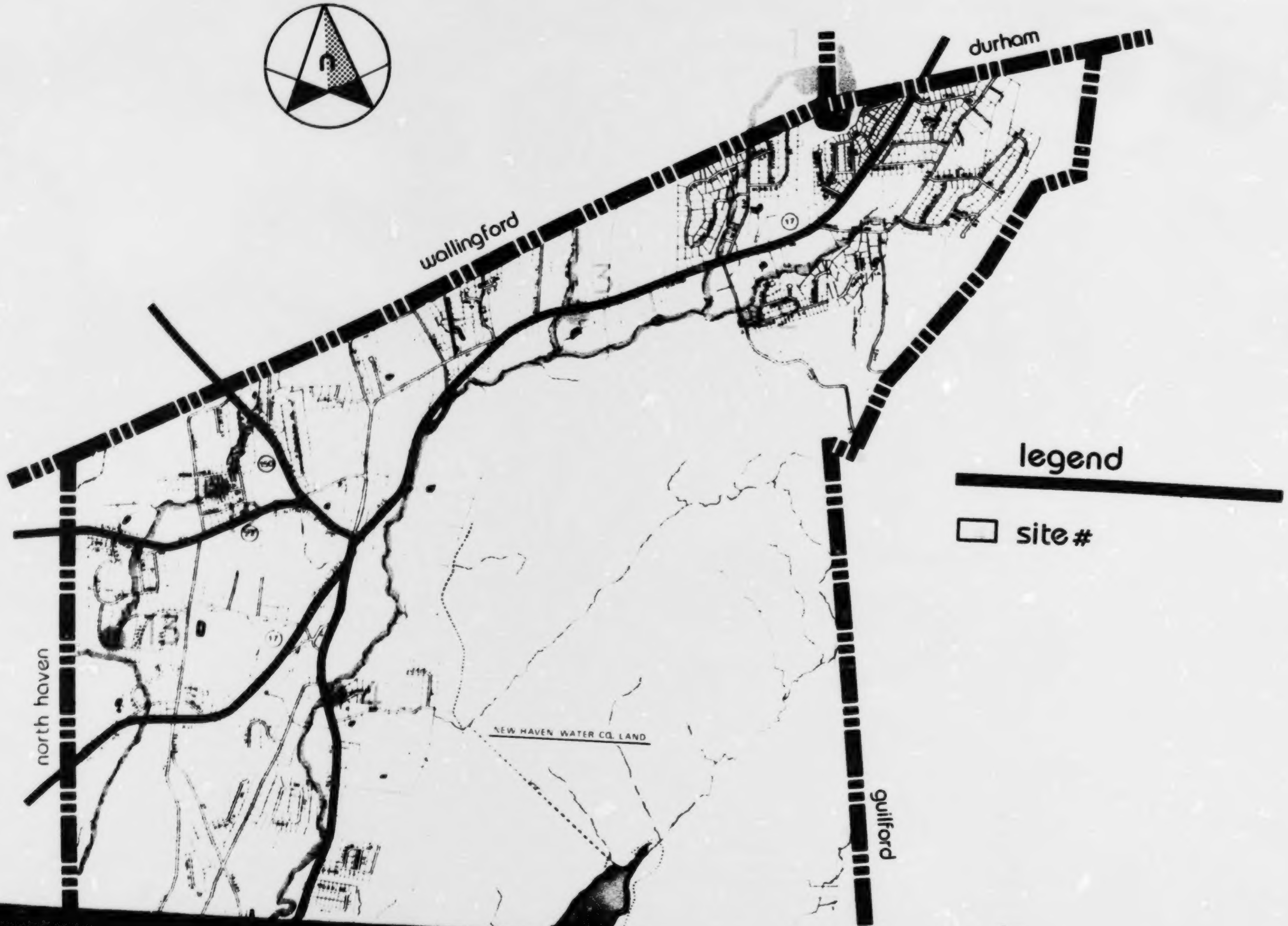
## NORTH BRANFORD, CONNECTICUT E.I.S.

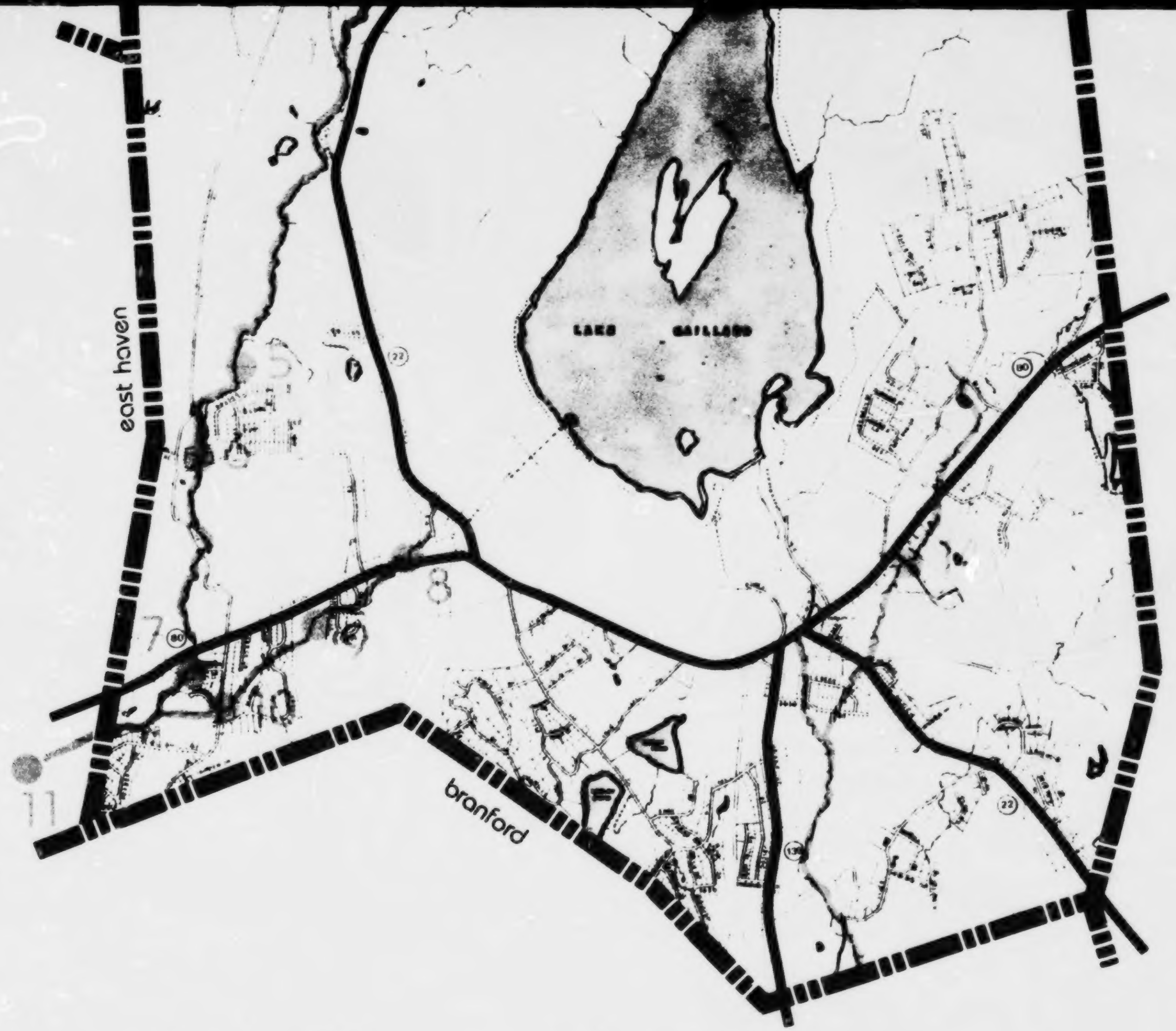
## GENERAL WATER QUALITY SAMPLING PROGRAM

Number of Sites - 14
Number of Samples per Site - 4
Sampling Period - March, April, May, 1978
Sampling Interval - about 2 weeks

| Parameter | Source(s) | Purpose | Results |
|---|---|---|---|
| Total Coliform Bacteria | Plants, Animal & Human Wastes | Detect possible human contamination | some high |
| Fecal Coliform Bacteria | Animal & Human Wastes | Detect possible human contamination | some high |
| Fecal Streptacocci Bacteria | Animal & Human Wastes | Detect possible human contamination | some high |
| Biochemical Oxygen Demand (BOD) | Decaying organic matter | Measure ecological stress | very low |
| Chemical Oxygen Demand (COD) | Decaying matter | Measure ecological stress | very low |
| Total Nitrogen | Animal & Human Wastes, Fertilizers | Eutrophication potential possible human contamination | high but safe |
| Nitrite-Nitrate | Animal & Human Wastes, Fertilizers | Eutrophication potential possible long term human pollution | high but safe |
| Total Phosphate | Fertilizers, Detergents | Eutrophication potential<br>Detect human pollution | some high |
| Surfactants | Detergents, Background | Detect human pollution | some positive |

Source: Anderson-Nichols & Company, Inc., 1978


n
durham
wallingford
north haven
guilford
NEW HAVEN WATER CO. LAND
17
13
legend
site #


east haven
branford
LAKE GAILLARD
5
7
8
10
11
22
80
139

## water quality sampling sites

**figure 1–4**

### north branford wastewater treatment facilities

date: february 1979

source: anderson-nichols & co., inc.

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24

Given the large amount of land area and the intermittent nature of both potential pollution sources, septic systems and agricultural practices, it is not surprising that this variability was found. It should be noted that the EIS data set was compared with the USGS data set referenced in Appendix B and is generally compatible in terms of spatial and temporal variability and magnitude.

The variability of the bacterial data is depicted in Table 1-3. The evaluations are based on the comparison of the sample with the State's water quality standards for Class A water. It is important to note that this comparison is only valid in a very general sense. In reality, the State standards apply to a more rigorous sampling procedure and statistical interpretation of data than that which was available through the EIS program. The assumption used in developing Table 1-3 is that if the values that were measured persisted, then the comparison would be valid.

The conclusions of the EIS water quality analysis are that the Burrs Brook data in the Foxon Area and in the Muddy River tributary in the Green Acres Area indicate pollution from human sources. Consequently, the highest pollution level found coincide with these areas where residents have most frequently reported problems. More discussion of the actual data and analysis is found in Section 4.0 and Appendix B.

## 1.5 Overview of Analysis of Alternatives

The EIS project team reached its recommendation by means of a two-step evaluation process. First, for those general areas in which problem areas were found, a number of alternative concepts were identified. These concepts were compared in a preliminary analysis in terms of potential environmental impacts and cost effectiveness. Secondly, the set of alternatives was reduced to a smaller set which was analyzed in greater depth and from which the EIS recommendations evolved.

## TABLE 1-3

## NORTH BRANFORD, CONNECTICUT E.I.S
## GENERALIZED WATER QUALITY SAMPLING RESULTS

| | Total Coliform Bacteria Class A Standard Exceeded | | | Fecal Coliform Bacteria Class A Standard Exceeded | | |
|---|---|---|---|---|---|---|
| Site # | Never | Sometimes | Always | Never | Sometimes | Always |
| 1 | | | X | X | | |
| 2 | | X | | | X | |
| 3 | | | X | | X | |
| 4 | | X | | | X | |
| 5 | | X | | X | | |
| 6 | | X | | | X | |
| 7 | | | X | | X | |
| 8 | | | X | | X | |
| 9 | | | X | | X | |
| 10 | | X | | | X | |
| 11 | | X | | X | | |
| 12 | | | X | | X | |
| 13 | | | X | | X | |
| 14 | | X | | X | | |

Source: Anderson-Nichols & Company, Inc., 1978

## 1.51 General Alternative Concepts

Where problem areas were identified, a system of analyzing alternatives from the simple scale to the more complex was developed. This resulted in the systematic evaluation of, first, continued on-site septic system use, second, small neighborhood sewer systems discharging to local leaching fields, third, limited-service cross-country sewers, and as the most complex option - a complete area-wide sewer system. The geographic areas in North Branford to which these alternative concepts were applied were the Town's Area B or Foxon Area and Area C, the Northford Area, which encompasses the northern end of Town from Green Acres to White Hollow. A more detailed description of the alternatives is found in Section 3.0.

## 1.52 Potential Impacts of Alternatives

In the preliminary analysis, consideration was given both to costs and environmental impacts. In terms of costs, both total and individual costs were computed. Under EPA regulations, the total costs must be used to demonstrate that the project chosen is the most cost effective. This does not mean, however, that the EIS recommends the cheapest solution. The recommended project must also be environmentally sound - a determination which includes both direct and indirect impacts. The impact of the cost of the alternative to the individual was also considered in addition to the impacts on natural and biological systems.

On a total cost basis alone, correction of known problems and continued reliance on on-site septic system use was the least costly choice. When, however, consideration of individual expense and hardship, public acceptability, and long term water quality protection in chronic problem areas was made, the final choice of a recommended project became more difficult. On the other hand, the cost of a complete area-wide sewer system was always an expensive solution to a small number of known problems, and might be accompanied by significant impacts.

## 1.53 Screening of Alternatives

In the Foxon Area, it was concluded that while the rehabilitation of septic systems may be theoretically attractive due to low cost, the implementation of this approach alone in older areas such as Arthur Court would be impractical due to small lot size. Elsewhere, in areas such as White Hollow, the idea may have merit. Much would depend, however, on both the availability of limited State funds for this type of solution and on the enthusiasm of local government to initiate and maintain this type of program.

The concept of small neighborhood sewer systems with discharge to community leaching fields was found to be promising in the White Hollow Area. There, the concept of utilizing small diameter gravity sewers which would transport the effluent from individual septic tanks to a common field has promise. Several potential leach field sites may be situated along Durham Road. Additional Step I work would have to be done to determine the ultimate feasibility of this alternative for this area. In the Foxon Area, the cost effectiveness of this type of alternative is diminished by the necessity to use individual pumps at each home due to the flatness of the area. In isolated small neighborhoods such as Miller/Grant Roads, the individual costs remain high.

The concept of a limited sewer system which would serve identified problems only is expensive in both total and individual costs despite assumed grant eligibility for the major items. In addition, potential environmental impacts would exist from undesired induced development which arises from the practical problems of limiting sewer capacity through design.

The evaluation of the concept of area-wide sewering, which presumably would lower individual costs by realizing economics of scale and by sharing the cost among problem homes and "potential problem homes", did not yield a satisfactory solution for either Area B or Area C. Individual costs were reduced only minimally due to the costs of laterals and low population densities. Total costs would be very high and unwarranted in light of the actual number of identified problems. Finally, the environmental impacts of using Federal and State money to stimulate sewer development, which in turn would stimulate a change from present low density development, would be significant.

The preliminary screening of alternatives is described in detail in Section 3.0 and Appendix C. This analysis led to recommendations which were further analyzed in Section 4.0.

### 1.54 Conclusions

The EIS recommends the use of Federal funds to assist in the construction of a limited sewer system in the Foxon Area (Area B) which would transport wastewater to the East Haven sewer system for eventual treatment in New Haven. This concept is a modification of the Town's Proposal for the area. It is explicitly recommended that no capacity beyond that intended to serve the Town's B1 and B2 areas be provided. The Town's Concept which would provide for capacity in the Foxon Interceptor for the Middle Valley Area could not be justified by existing or projected need and would significantly affect the environment.

In the Green Acres Area, the EIS found that a similar problem of solving present and projected needs by a large sewer system exists. Although the Town has not applied for funding at this time, the conventional system already designed for the Green Acres Area is assumed to eventually extend into the lightly developed Upper Valley of the Farm River. Existing problems were found in the Green Acres Area that may warrant a sewer system, but the EIS does not recommend providing extra capacity in the initial system due to the lack of demonstrated need and the potential for significant environmental impact. A limited system to serve only Green Acres would not adversely affect the environment but would be expensive. On the basis of cost, the Town might wish to explore additional alternatives such as rehabilitation on a house-to-house basis, through additional Step I work.

In the White Hollow Area, rehabilitation of the existing individual septic systems or the investigation of a neighborhood sewer system with a community leaching field are worthy of further study. With the current interest of the State in this concept and the possibility of available funds, a Step I study at this time would be recommended.

# SECTION 2.0

# PURPOSE AND NEED

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The underlying intent of this section is to set forth, in a simple direct statement, the whole purpose for the EIS. It provides the general public with a perspective from which to view the process and a context in which to evaluate the results.

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## 2.1 Precipitating Action

The EIS was required because of the Town's Proposal to apply for Federal and State funds for the construction of a sewer system in the southwestern corner of North Branford. The proposal to build sewers in the "Foxon" area, the Town's B-1 area, generated significant environmental controversy. Before EPA can approve funding, it must issue a negative declaration indicating that, based on information that was available, no overriding environmental considerations remain. Because both EPA and the State DEP reviewers felt that there were unanswered questions surrounding the Town's Proposal, it was decided that an EIS should be prepared to study the problem and resolve the issues.

## 2.2 EIS Findings

This EIS project concludes that there are chronic wastewater disposal problems in the Foxon area, the Green Acres area, the White Hollow area, and in the smaller areas of Dorie Drive, Jerz Lane, Miller/Grant Road, and Surrey Drive.

This EIS also finds that the Town's Proposal for the Foxon area would basically relieve the existing wastewater disposal problems in the Foxon area but would have the potential for long-term adverse environmental impact in the general area of the Middle Farm River Valley if the Proposal ultimately led to the Town's Concept for sewering there. There is no present justification for sewers in that area nor is any anticipated.

Analysis of the Town's Concept for sewering elsewhere in town, in the areas of Northford Village and the Upper Farm River Valley led to similar conclusions - construction of sewers cannot be justified due to lack of demonstrated need and/or significant environmental impact.

## 2.3 EIS Recommendations

The EIS recommends:

-- A modified sewer proposal for the Foxon area. The recommended plan would call for Federal participation in the basic interceptor to solve demonstrated chronic problem areas such as Arthur Court, Brook Lane, and Dorie Drive.

The EIS does not endorse the construction of the oversized portion of the interceptor which was previously designed for eventual sewer extensions into the Middle Valley area. Also, on the basis of known problems, the EIS proposal differs from the Town's Proposal in terms of Federal participation in the funding of certain local collector sewers within the Foxon area. The EIS favors the immediate construction on certain streets over earlier recommendations.

-- Further study on the feasibility of on-site rehabilitation in the Green Acres area before proceeding with sewer construction due to the EIS findings on total and individual costs. In addition, to the conventional sewer concept, a pressure sewer system discharging to the Clintonville Road interceptor should be explored. This work could be done as extended Step I action.

-- Additional engineering studies as Step I work to determine the feasibility of on-site rehabilitation and/or community septic systems in the White Hollow area. These concepts appear favorable in terms of feasibility and environmental impact.

-- Elsewhere in the study area, the EIS recommends continued reliance on septic system use on a long term basis.

## SECTION 3.0

## ALTERNATIVES INCLUDING THE PROPOSED ACTION

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In this portion of the EIS, the alternatives that were analyzed to solve the local wastewater problem are discussed. First, the general framework from which specific North Branford alternative concepts were developed are described. Thus preliminary alternatives for each problem sub-area are identified and the criteria used in their formulation, including cost-effectiveness, are acknowledged.

The preliminary analysis include:

- project compatibility with known existing need and anticipated need
- costs including total, local and individual shares
- ultimate feasibility and likelihood of implementation, including consideration of funding availability and local Town and individual acceptance of various types of solutions.

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## 3.1 General Discussion of Alternatives

Federal legislation and guidelines for the preparation of a statement require a number of alternatives be seriously considered before selecting a recommended project. Also, a range of alternatives varying from the simple to the complex must be considered. The alternatives that are developed to solve the actual demonstrated local wastewater problems may consist not only of different types of solutions but also be focused on different geographical areas and different time frames. Consequently, a number of steps must be taken to clearly define equivalent alternatives which can be compared.

In order to find true differences in cost of various projects, alternative projects must be similar in terms of geographical area and in terms of the time frame under consideration. Essentially, apples must be compared with apples. Also, the alternatives formulated for comparison purposes in the impact statement may vary from those projects with which people have identified earlier. A method must be developed however to incorporate in all these alternatives some basis in reality. A preliminary discussion of alternatives follows.

## 3.2 No-Action

One concept that must be evaluated by law is the idea of doing nothing to change wastewater management practices in the community. This approach has been called the "No-Action Alternative." To some residents who have had long-term problems, such a consideration may seem ridiculous. Nonetheless, the required exercise of identifying the long term environmental impacts of this alternative may help to clarify the magnitude of the local problem. There is always the possibility that the problem is extremely localized or limited to a few individuals. In such special cases, it may be most appropriate to concentrate on solving these few problems without involving the whole community.

## 3.3 On-Site Alternatives

For the most part, a range of alternatives is defined by the simplest repair of the existing septic system on one hand, to the installation of a town-wide sewer system on the other. In addition, in special situations, unusual or innovative approaches must be used to alleviate specific pollution problems. In past practice, however, where wastewater disposal problems have been identified, a sewer system has often been the only alternative that has really been considered by the Town. This, in part, has been probably due to requirements of previous Federal legislation which excluded the solution of problems on individual house lots from federal funding eligibility.

The 1977 FWPCA Amendments have now made the consideration of other alternatives practical at the local level by including on-site alternatives within the framework of grant eligibility. More specifically, the amendments require that it be demonstrated that on-site disposal will not work before recommending a complete sewer project. In the final analysis, however, it is the availability of funds at the State level which determines those projects which will be funded first. Consequently, small scale projects may well find themselves ranked low on a particular State priority list at this time. Because of the newness of this legislation, it is likely that the merit of this type of alternative approach to wastewater management on a community-wide level will be evaluated on a case-by-case basis. A discussion of some of the approaches that might be used by an individual or by the Town follows.

### 3.31 Changes in Use of the Existing Septic System

Some wastewater disposal problems can be solved by education of homeowners as to the proper use of septic systems. Septic system overloading is probably the most common problem, especially in older homes where young families using modern appliances are generating wastewater flows far in excess of what the system may have been intended for. A conscious attempt on the part of a homeowner to reduce overall water consumption may help relieve the cause of the problem. New plumbing devices are widely available to help attain the goal of efficient water usage. Homeowners should first examine water records when trying to determine the cause of a septic system failure. Rule of thumb estimates allow for 60-80 gals/day as a design value for sewage that is generated by each person. In some cases where problems have occurred, conscious management of water use can allow the homeowner to continue using his existing system with no other repair.

Other practices which may aggrevate problems where the system is marginal include the casual disposal of oil, grease, and chemicals. Both this type of abuse and the hydraulic overloading might be averted in communities by the periodic publication of guidelines on septic system use.

### 3.32 Repairs to Septic Systems

In some instances, septic system failures have been due to broken pipes, broken or clogged distribution boxes, or erosion of cover material at the edge of the leaching bed. All that may be needed to correct the problem is the simple repair after its cause has been determined. In order to make such an evaluation, the individual homesite must be visited by a trained person, a sanitarian or an engineer, who has access to accurate records as to the nature and location of the system.

The identification of this type of problem is often complicated by the homeowner's ignorance concerning his system and his concern over possible expenses that he may incur in making his problem known. The local health agent, the East Shore Sanitary District, headquartered in Branford, will recommend several levels of repair which reflect different cost levels and levels of confidence in performance which are available to the troubled homeowner.

### 3.33 Expansion of Existing Systems

Changes in water consumption patterns over time and in the number of occupants in a building may necessitate expansion of the system. For this reason, many health agencies require a re-evaluation of the existing system when the change in use is significant. In many communities, new systems are deliberately required to be oversized in order to avoid this type of problem.

### 3.34 Replacement of Leaching Field

In some cases, complete replacement of a leaching field may be required. It is possible the homeowner may wish to construct the new field in an entirely different location so as to save the old field as a measure of insurance against future unknown failure. The Connecticut Code for new construction requires that an expansion area be designated on any new plan for septic system construction and that this expansion area be tested for soil capability and reserved for future use.

## 3.35 Site Modifications/Curtain Drains

Some repairs to systems may be more expensive due to the inherent site limitations of the soils and the combination of steep slopes and high groundwater. It may be necessary to divert the natural flow of groundwater by the construction of so-called curtain drains up-slope of the leaching field. The drain consists of a trench dug uphill of the leaching field and filled with stone. The water is intercepted by the trench and diverted from the field.

In many of the problem areas of North Branford, such as Sky Lark Drive and Brook Lane, the homes are built on steep slopes which contribute to the wastewater disposal problem. In other areas where one lot has been cut into the slope above another, in step-like fashion, often the drainage of one lot interferes with the leach field of the lot below it. Curtain drains may help in these circumstances.

## 3.36 Mounded/Pumped Systems

Inherently thin soil or unfavorable slope conditions may necessitate the construction of the leaching field in a mound system. A mound consists of an elevated leaching field where the sub-soil and soil are brought in from another site so as to attain the proper thickness and consistency for a correct percolation and wastewater treatment.

This approach is expensive because the field must be built-up. Where a pump is required to bring the effluent up from the septic tank to the leaching field for final disposal, more frequent maintenance and the payment of operating expenses is required. For all these reasons, the use of the mounded system is often the last resort. In high groundwater areas, such as Arthur Court, mounding may be the only method of rehabilitation with any promise. Even then, on many residential properties, the appearance of the mound may be aesthetically unacceptable.

### 3.37 Summary

The general types of on-site solutions described above reflect a dilemma which exists when evaluating this type of solution. While at first glance, the notion of modification of existing systems seems inherently more simple and less expensive than the concept of a sewer system, the actual implementation of this type of program on a town-wide basis becomes far more difficult than anticipated. Very specific information on a house-by-house basis is required, which may not be available. Water consumption, for example, is not known where private wells are used. In older developments, the size and location of the septic system may not be known. Even where engineered plans have accompanied septic system permits, the actual field may well have been modified when problems were encountered during construction and "as built" sketches were prepared which are frequently inferior. The effort which is required to even attempt to acquire this information by means of house-to-house survey is both expensive (about $150 per house) and does not guarantee that it will be successful enough to allow a town to proceed to Step II, the design phase, of a normal Facility Plan.

In this EIS, the evaluation of on-site rehabilitation as a funded area-wide approach is of necessity a preliminary effort. While it may be possible to make some judgements as to the feasibility of this approach where area-wide physical conditions are clearly constraints, many "grey areas" are possible which would require additional Step I engineering effort.

## 3.4 Local Sewer Systems

Where homes with wastewater problems cannot be repaired by on-site rehabilitation of septic systems, and the area is remote from any existing sewer system, the alternative of a small localized sewer system should be explored. In concept, such a system may serve a dozen homes, and treatment and disposal of effluent would be local. Because of its simplicity and economy, treatment by septic tank would be the likely treatment mode with ultimate discharge to sub-surface leaching fields.

In general, consideration of this alternative requires certain local conditions. A sufficient concentration of problem houses must exist, and a suitable disposal site must be located. Also, a decision must be made on how to treat houses that fall within the problem area but do not have problems themselves. Even a small system of conventionally designed sewers is expensive and must be used by a large group to reduce the costs per unit to a tolerable amount.

In specific neighborhoods, various modifications of conventional sewer design may be feasible which reduce the cost of the system significantly. A system of small diameter gravity pipe may be desirable in newer neighborhoods where adequate septic tanks already exist and can be utilized for separation of the sewage prior to conveyance through the system for ultimate disposal. It is necessary that the maintenance of the tanks be assumed by a public management system in order to insure the integrity of the sewer and leach field design.

In areas of hilly terrain or shallow bedrock, another variation of small system design that may be justified is the pressure sewer. It, too, shares the advantage of low cost installation of pipe as well as a certain independence from slope. The system requires individual pumps, however, which requires continued maintenance.

Most community systems also require that a suitable leaching field site be found within reasonable proximity to the problem area. The site shall have certain characteristics, including suitable soils, sufficient size, compatibility with surrounding land uses and preferably be down gradient of the service area. The cost of this land becomes a factor in evaluating this alternative. The local sewer alternative is worthy of consideration in problem areas such as White Hollow which has been referred to as a chronic problem area, yet is remote from any existing sewer.

## 3.5 Town-wide Sewer System

In many communities, such as North Branford, the sewer concept that was developed a decade ago assumed that the system would eventually serve the whole Town. It was generally assumed that septic systems were a temporary solution only and that it would be to the Town's benefit to get as large a project as possible while grant money was available. Encouraged by older EPA planning period guidelines of 50 years, concepts were developed that included large trunk systems which would handle all of the flow within a drainage basin under saturation occupation. With some modifications, this is the type of concept that has been developed for North Branford.

Since these early plans, a number of questions have been brought up nationwide which necessitate taking a second look at this concept. Included are the questions of national economic efficiency (cost-effectiveness), and potential environmental impact. The allocation of the national and State wealth must be evaluated within several frameworks aside from local advantage. The local benefits should be more clearly identified since local residents are asked to pay for a significant portion of the system. Also, the local impacts that a large sewer system may have, such as direct impact on natural systems and indirect impacts, such as stimulation of development, which may be viewed by some as undesirable, have prompted a review of this type of system. EPA's response to these concerns was demonstrated in relatively recent program memoranda, PRM 77-8 and 78-9, in which the necessity to demonstrate the basis of the need for a sewer project was more clearly specified. In addition, public comments received during the environmental review process of project proposals have shown increasing public interest and familiarity with environmental impacts, particularly in the socioeconomic sphere.

Reaction to large sewer systems planned for long planning periods has highlighted the difficulty that people have in perceiving the future and the divergence of views of community objectives. As a result, the recommendations that ultimately are often implemented consist of significantly reduced systems with limited capacity for future service.

## 3.6 Development of Alternatives for North Branford

### 3.61 Problem Areas

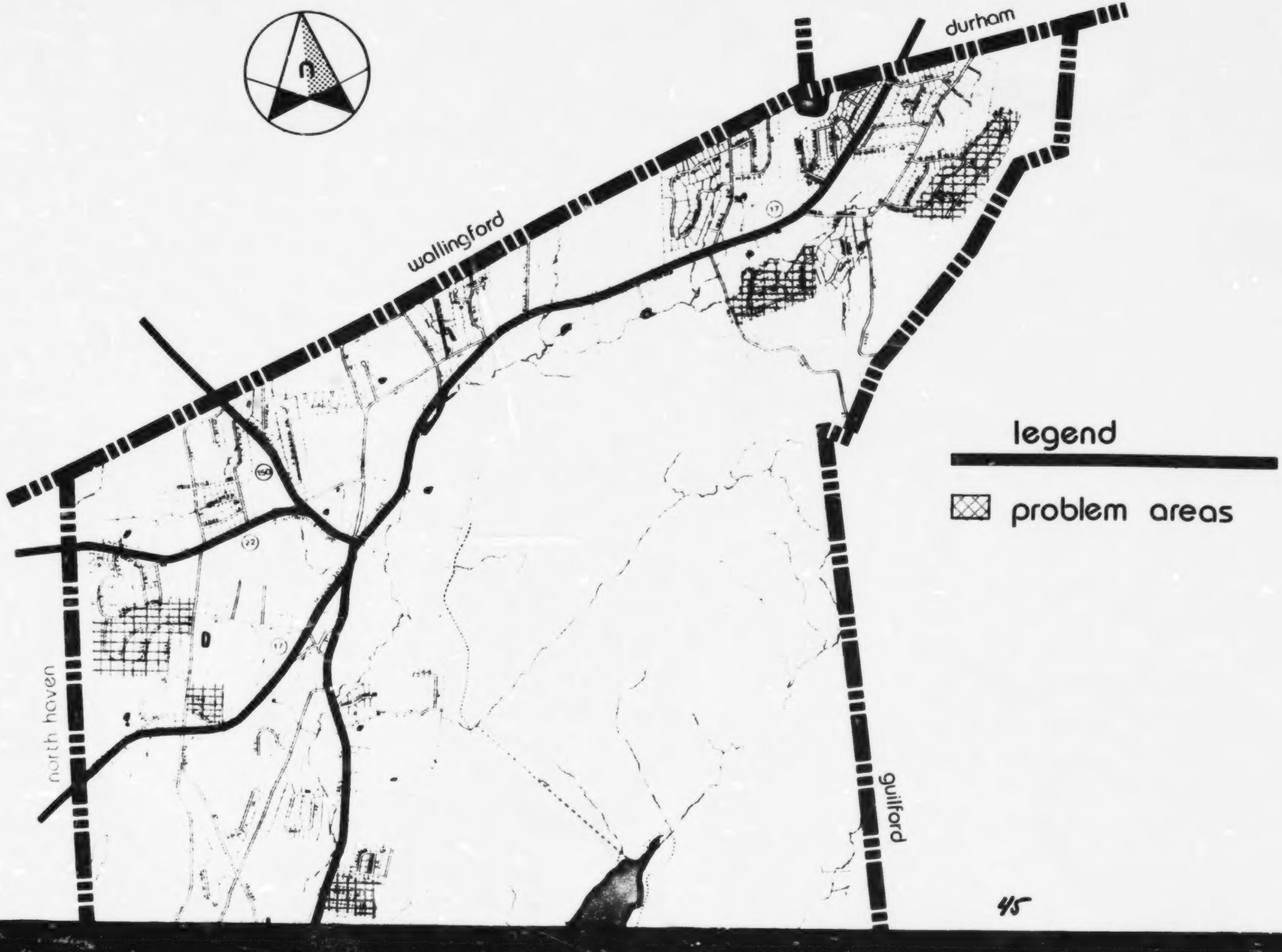
The type of alternatives that may be selected in a community to solve water pollution and wastewater disposal problems will depend on the type and location of the problems that are found. The EIS project had a number of sources of information which were used to identify actual problem areas. These included:

- -- Previous engineering reports
- -- Records of East Shore Health District
- -- Watershed sanitary surveys
- -- Previous DEP sanitary surveys
- -- The town-wide EIS questionnaire
- -- EIS workshops
- -- The EIS/DEP sanitary survey
- -- EIS field work

From the total data set that these items comprise, the EIS team identified those areas of significant problems. These included the following areas: (Figure 3-1)

- -- Dorie Lane
- -- Arthur Court
- -- Sunset Lane/Brook Lane
- -- Jerz Lane
- -- Miller Drive/Grant Road
- -- Surrey Drive
- -- Green Acres
- -- Walnut Lane

In these areas, evidence of septic system problems was found frequently enough, that in the judgement of the EIS team, the most appropriate solution might require a community sponsored program rather than independent individual efforts. In some instances, these areas are the same as those previously identified by the Town for which sewers were recommended. Such is the case in the Arthur Court area. Other areas, such as Surrey Drive, Jerz Lane, Miller/Grant Roads were not previously identified. A full explanation of the determination of these "problem areas" is included as Appendix D.


n
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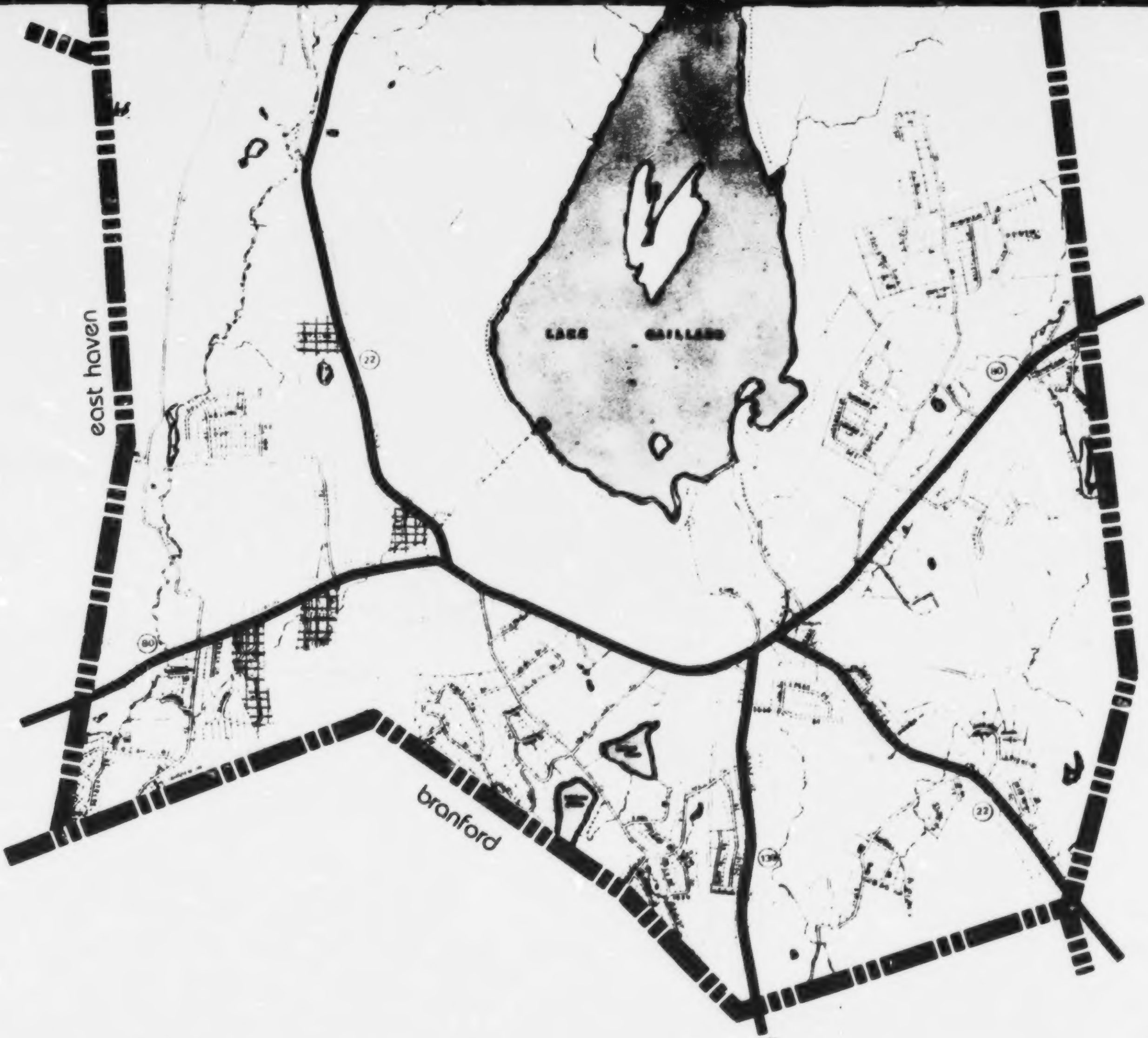
▨ problem areas


east haven
LAKE GAILLARD
22
80
80
22
139
branford

problem areas

figure 3-1

north branford wastewater treatment facilities

date: february 1979

source: anderson-nichols & co., inc.

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environmental impact statement ■ environmental protection agency

anderson-nichols & co., inc. technical consultant

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In order to provide continuity and permit comparisons of the alternative approaches, the problem areas which were identified were grouped. The grouping had its basis in part in the sewer areas of the Town's Proposal & Concept. The groups used here are:

- -- Foxon area - includes Foxon Road, the Arthur Court area, Sunset Lane, Brook Drive - the Town's Area B.
- -- Green Acres - includes Venta Drive, Ruta Drive, Palanga Drive.
- -- White Hollow - includes Walnut Lane area, Sky Lark Drive.

### 3.62 Alternative Concepts

With the identification of the problem areas, the task of developing feasible alternative methods of problem solving was initiated. For each problem area, a set of alternatives was developed which appeared technically feasible at the first level of analysis. One important aspect of this process which should be noted is the requirement that each alternative for a specific sub-area be equal in terms of the land area it covers and the time period under consideration. This is necessary in order to compare the costs of various alternatives.

Another aspect of this preliminary phase of the evaluation of alternatives that is noteworthy is the framework within which costs are compared. The first level evaluation requires that total costs be used for comparison purposes before local advantages, that funding permits, are considered.

The lowest cost project is not necessarily the one that will be chosen. To begin with, cost-effective analysis is a general level of analysis for which only a certain amount of accuracy can be assumed. For example, if the costs of two alternatives were to fall within 10% of each other, the lowest would not automatically be selected because the total cost figures are not absolutely accurate. Other factors may sway the choice in one direction or another.

Environmental impact is the major consideration that is used in addition to cost. This area includes:

- -- the physical environment - that is the land, air, and water
- -- the biological environment - plants, animals, and habitat
- -- the socio-economic environment

Also considered are short term versus long term impacts and direct versus indirect impact. Consequently, the economic impact on the individual and the general "character of the community" are legitimate environmental issues.

Finally, alternative solutions that may be technically and economically feasible must still be evaluated for their social acceptability. Since it is the local people who must live with the alternative, its long-term integrity can only be assured if they believe in the project.

For each of the three sub-areas where significant problem areas were found, a set of conceptual alternatives was developed. The alternatives and the basis for their selection follow.

### 3.63 Foxon Area Alternatives

In the Foxon Area (Town's Area B) a number of specific problem areas were identified. These included the Arthur Court, Dorie Lane, Sunset Road/Brook Lane, Jerz Lane, and Miller/Grant Roads area. The alternatives were tailored to solve the basic problems in these areas and to address the long term wastewater treatment needs of the general area as well.

### 3.631 Foxon Alternative A - Continued On-Site

This alternative consisted of the continued long term use of septic systems throughout this area. Where failures had been noted, it was assumed that rehabilitation of the system would be done and that a small number of systems would require substantial repairs every year. Also, a cost was estimated for the pumping of everyone's septic tank every two years.

### 3.632 Foxon Alternative B - Community System

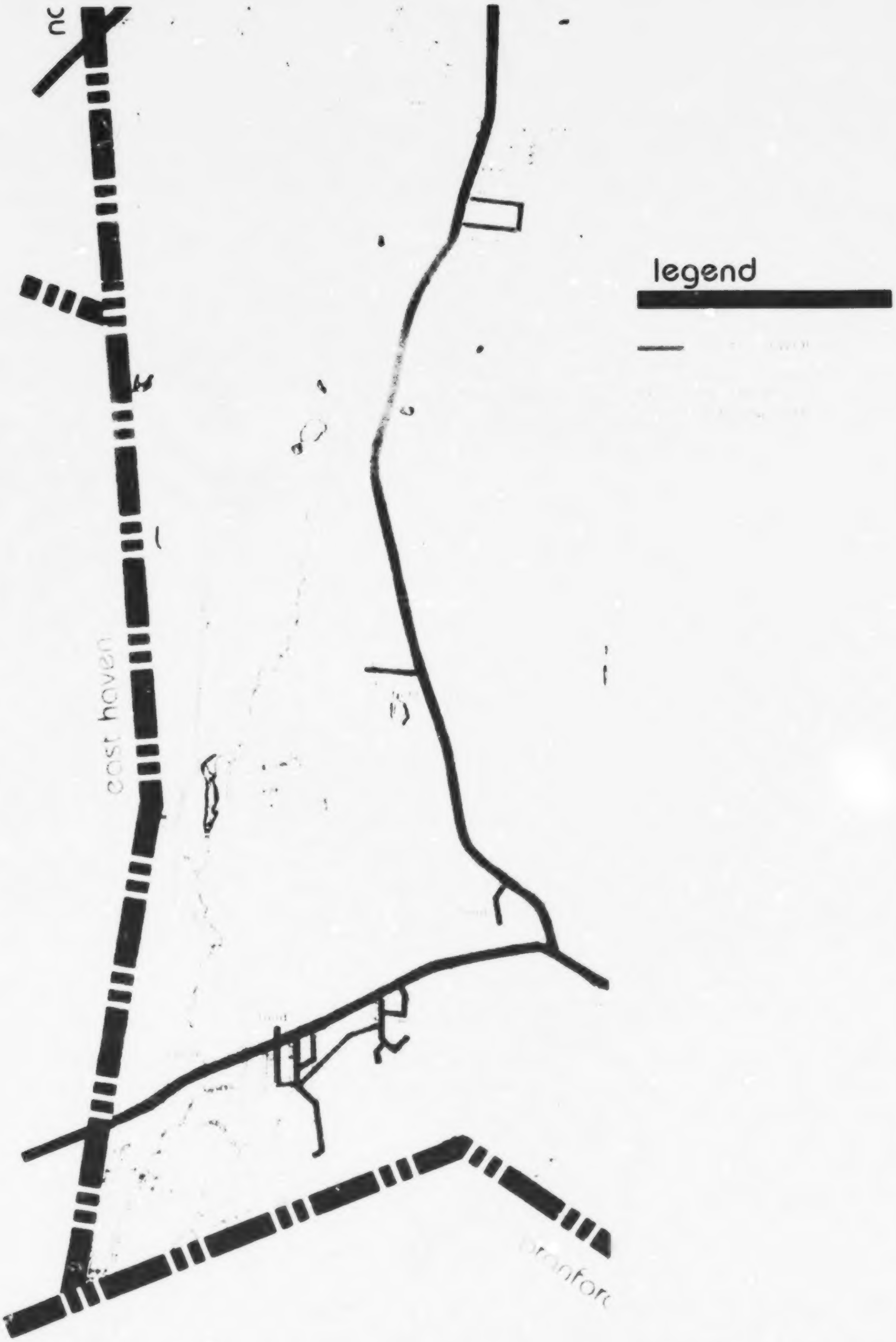
This concept involves constructing several small sewer systems in the problem areas with eventual disposal of the wastewater in a subsurface leaching field in the area. (Figure 3-2) Elsewhere within the Foxon Area, it is assumed that septic systems will be used, a small number will be repaired each year, and all will be pumped every two years.

### 3.633 Foxon Alternative C - Limited Sewer System

This solution would involve construction of a sewer system to carry wastewater from the problem areas to the existing sewer system in East Haven. (Figure 3-3) As in the case of the other alternatives, the remaining homes would rely on on-site disposal.

### 3.634 Foxon Alternative D - Full Sewer System

This project would include construction of a sewer system to solve the problems that had been identified as well as provide service to all residents. (Figure 3-4)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east haven
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foxon alternative-b figure 3-2

north branford wastewater treatment facilities

date: february 1979

source: anderson-nichols

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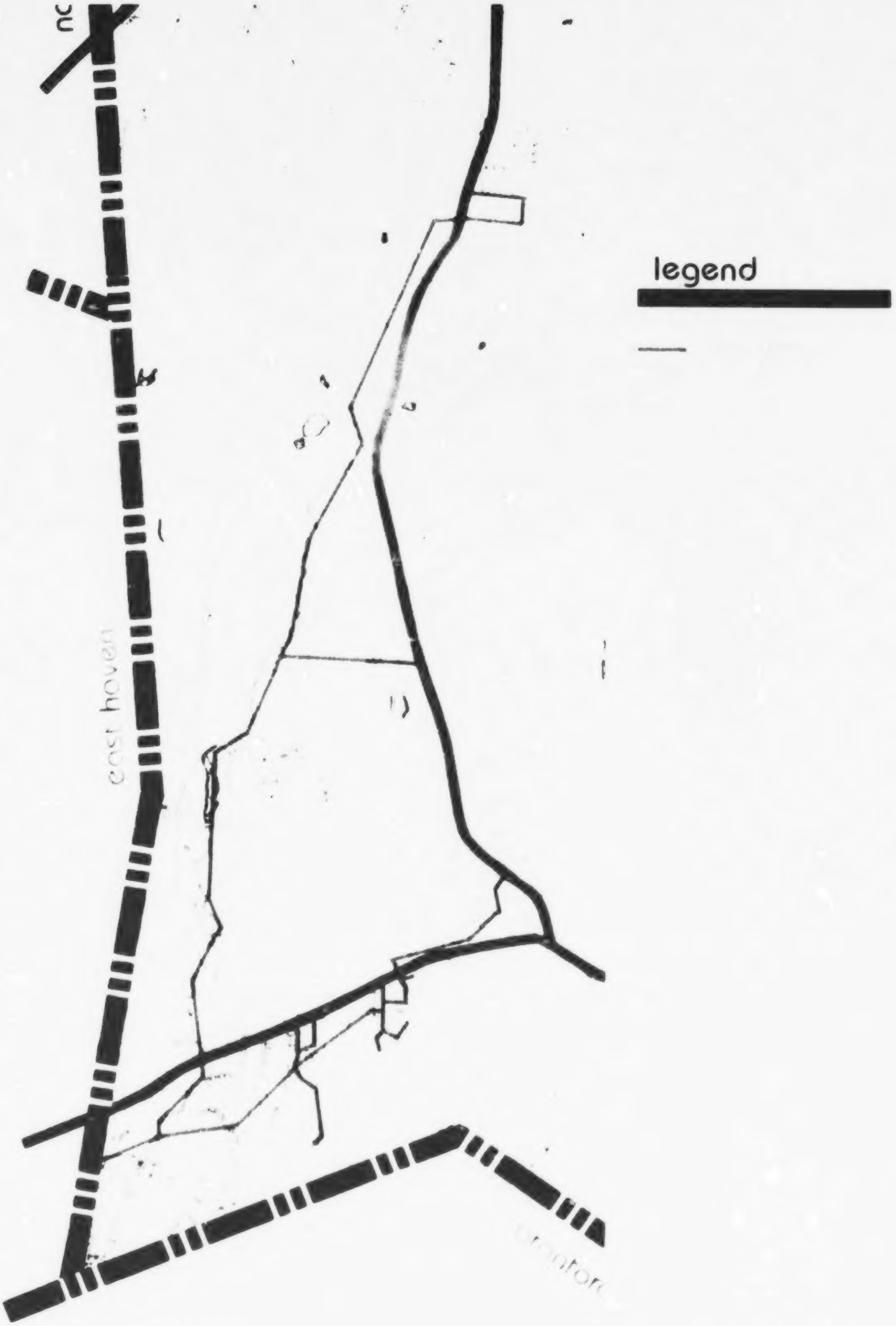
environmental impact statement ■ environmental protection agency

anderson-nichols & co., inc. technical consultant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foxon alternative-c

figure 3-3

north branford wastewater treatment facilities

date: february 1979

source: anderson-nichols

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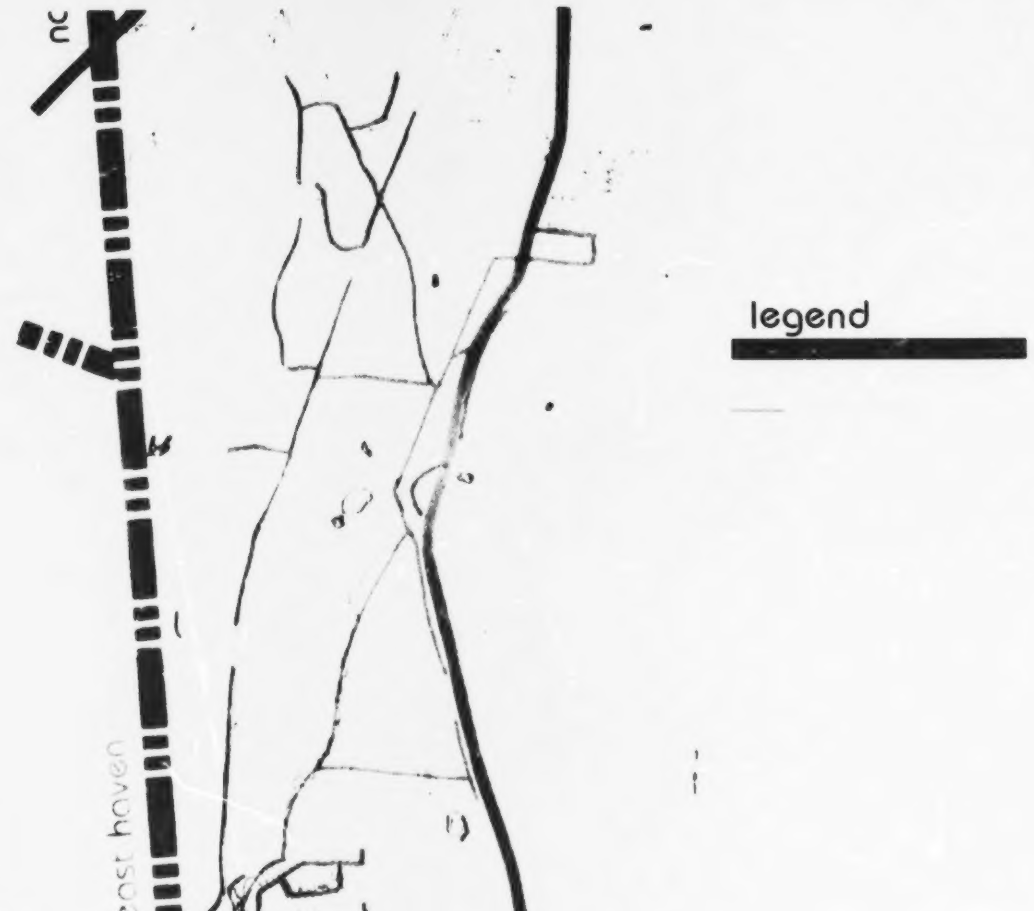
technical consultant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foxon alternative - d

figure 3-4

north branford wastewater treatment facilities

date: february 1979

source: anderson-nichols

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technical consultant

## 3.64 Green Acres Area Alternative

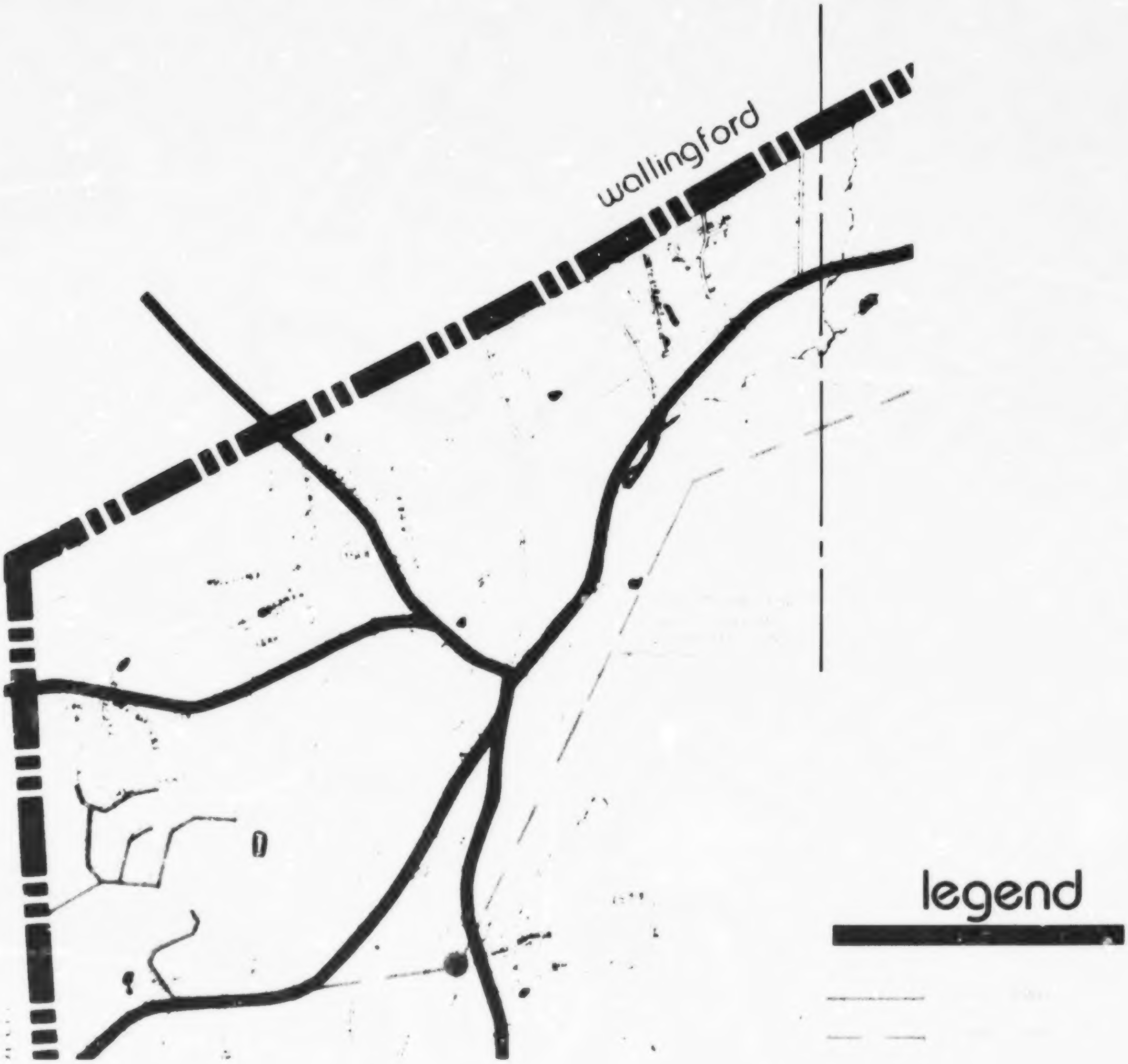
In the Green Acres Area (Town's Area C-2), two basic alternatives were examined for this problem area and nearby Surrey Drive.

### 3.641 Green Acres Alternative A - Continued On-Site

This alternative calculates the cost of rehabilitation of the problem systems within the area and the costs of anticipated repairs and a continuing maintenance program.

### 3.642 Green Acres Alternative B - Sewer System

This approach would connect the two problem areas of Green Acres and Surrey Drive to the Muddy River Interceptor in North Haven. (Figure 3-5)



green acres alternative - b

figure 3-5

north branford wastewater treatment facilities

date **february 1979**

source **anderson-nichols**

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environmental impact statement ■ environmental protection agency

anderson-nichols & co., inc.

technical consultant

## 3.65 White Hollow Area Alternatives

Within the Northern Farm River Valley area, two extensive problem areas were identified in the White Hollow and Walnut Lane areas. These areas are contained within the Town's C-3 area. The alternatives include:

### 3.651 White Hollow Alternative A - Continued On-Site

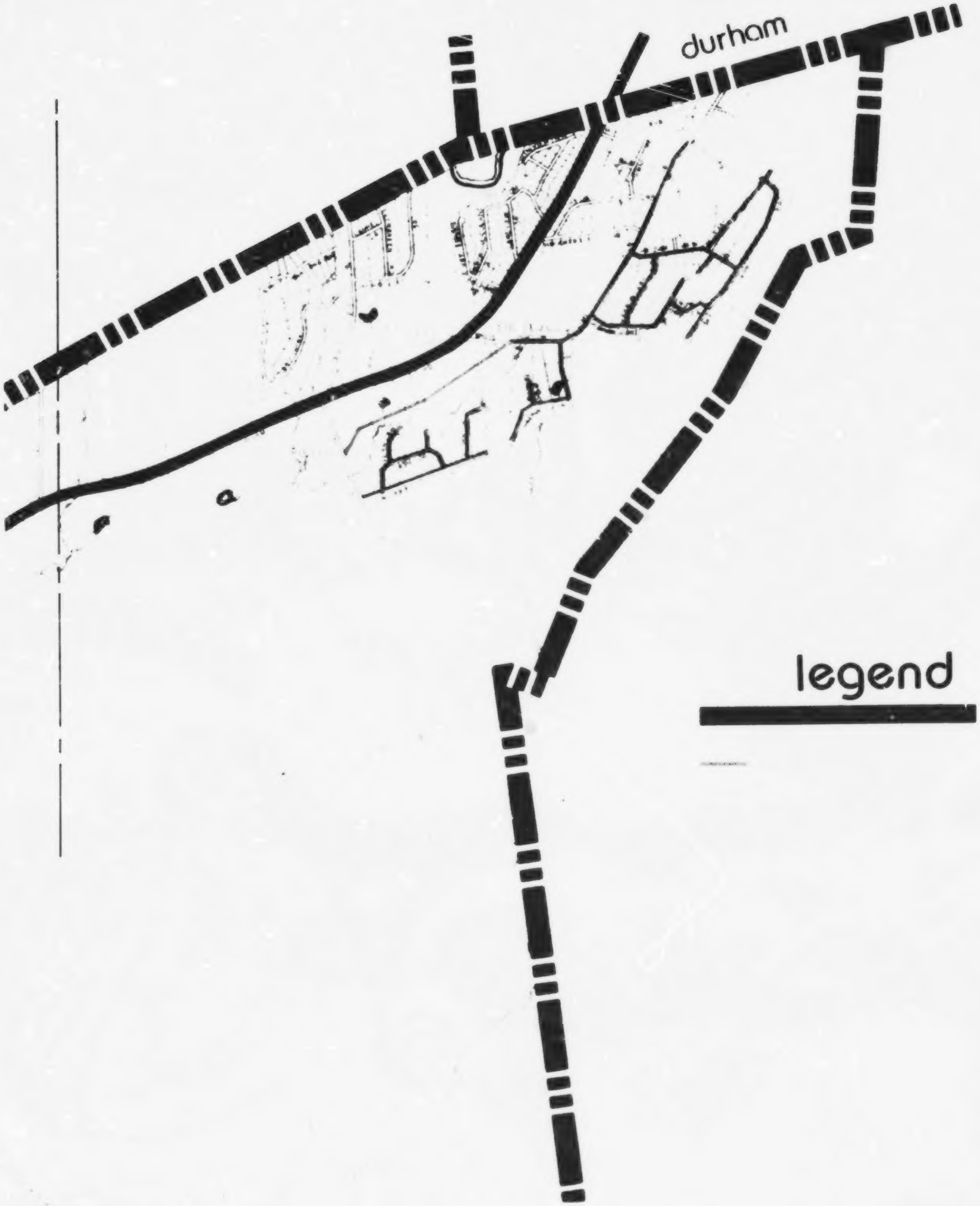
With this alternative, the costs are estimated for rehabilitating failed systems, a certain number of repairs each year, and a continued maintenance program thoughout the area.

### 3.652 White Hollow Alternative B - Community Systems

This concept was based on transport of wastewater from the White Hollow and Walnut Lane areas by gravity to a common leaching field near the intersection of Durham Road and Reeds Gap Road. (Figure 3-6) Elsewhere within the Upper Valley, residents would continue to rely on their septic system and pay the costs associated with their use under proper management. A possible variation on this alternative would be to utilize two fields, one for each area.

### 3.653 White Hollow Alternative C - Limited Sewer System

This alternative would have the wastewater generated by the two problem areas transported down the valley to Northford and pumped west over to the existing North Haven sewer system. (Figure 3-7) On-site systems would continue to be used for non-problem areas.



white hollow alternative-b

figure 3-6

north branford wastewater treatment facilities

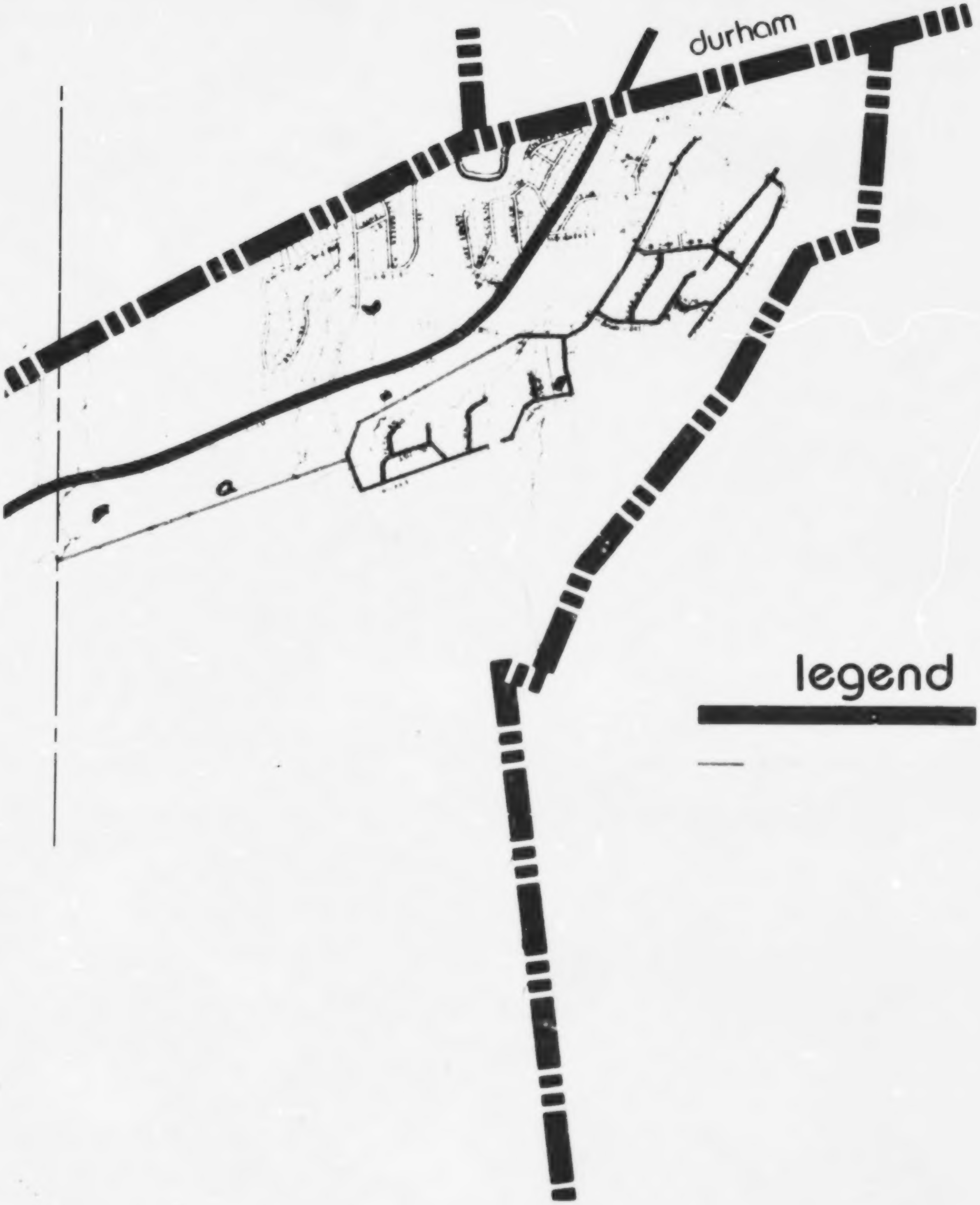
date february 1979

source anderson-nichols

environmental impact statement ■ environmental protection agency

anderson-nichols & co. inc.

technical consultant



white hollow alternative~c

figure 3-7

north branford wastewater treatment facilities

date february 1979

source anderson-nichols

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environmental impact statement ■ environmental protection agency

anderson-nichols & co., inc.

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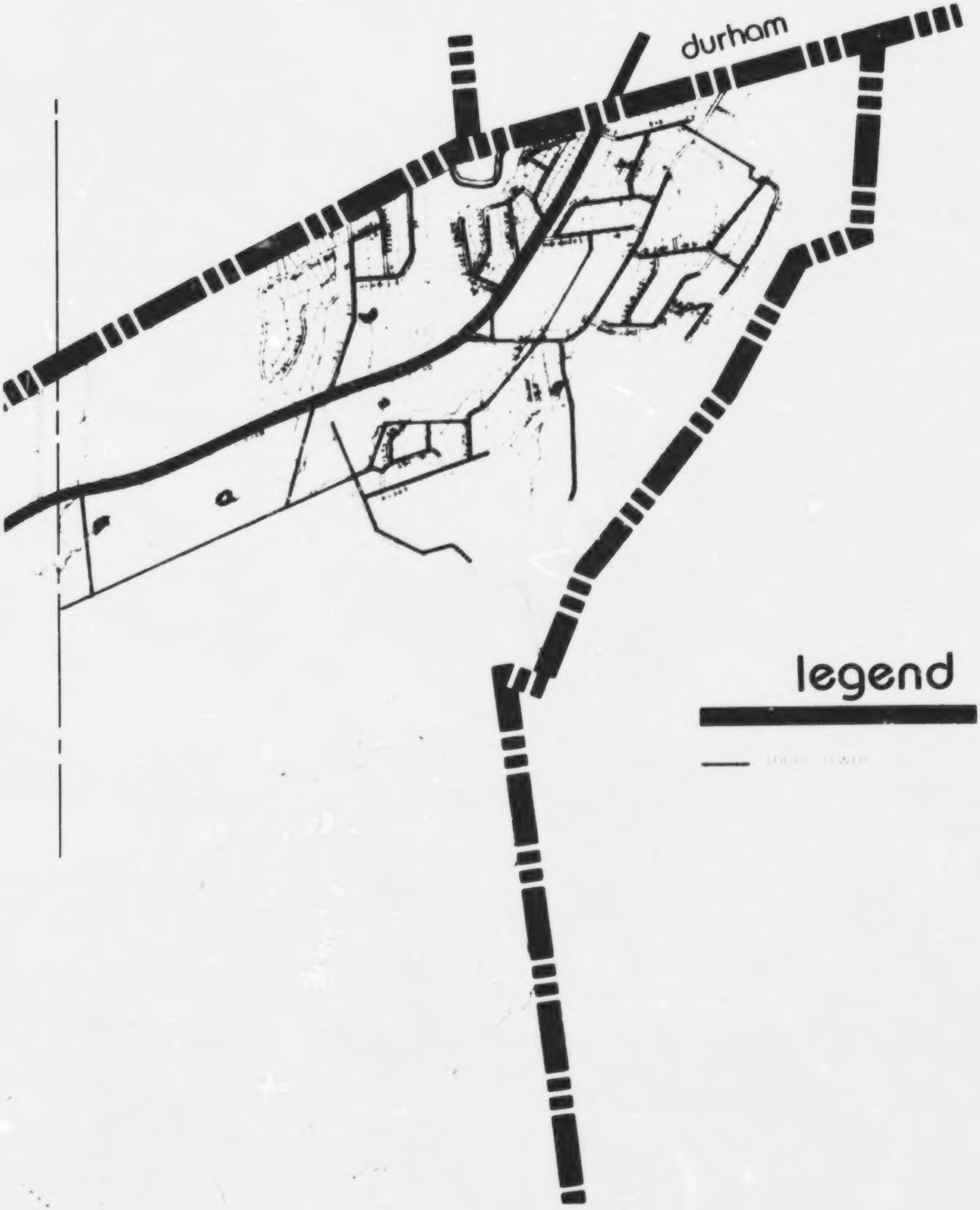
durham
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local sewer

## white hollow alternative-d

figure 3-8

north branford wastewater treatment facilities

date: **february 1979**

source: **anderson-nichols**

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environmental impact statement ■ environmental protection agency

anderson-nichols & co., inc.

technical consultant

### 3.654 White Hollow Alternative D - Full Sewer System

The installation of a sewer system to serve both existing problem areas and all other homes within the Northern Valley Area was the solution that was analyzed. (Figure 3-8)

## 3.66 Potential Impacts of Alternatives

The alternative concepts were analyzed in a preliminary effort to determine if any would create significant environmental impacts. This step was viewed as a first-pass in attempting to define a set of alternatives that might be seriously considered to solve the problems of a specific sub-area. The impact summary (Table 3-2) is not exhaustive but rather focuses on those positive (+) impacts and negative impacts (-) which relate primarily to the relationship of the proposal to the identified wastewater problem, the benefits to the Town and the individual, and general indirect effects.

Within each environmental sub-area, the following considerations were used in determining the direction and magnitude of the impact assessments.

### 3.661 Public Health

Elimination of known overflows from failing septic systems was the basis for a positive impact.

### 3.662 Aesthetic Factors

Elimination of known nuisances associated with septic system overflows, grey water discharges on the surface, and malodorous standing water was the basis for a positive impact.

### 3.663 Habitat Potential

Elimination of raw water discharges which impose pollution loadings on natural water courses was the basis of a positive impact.

### 3.664 Future Water Supply

Sprawl development or uncontrolled stimulated development which might result in long-term degradation of water quality was the basis of a negative impact. Limited controlled development was the basis of a positive impact.

### 3.665 Wetlands

Construction impacts were the basis of a negative impact.

### 3.666 Existing Habitat

Conversion of undeveloped or agricultural land to more intensive use either through land consuming sprawl development or sewer stimulated development was the basis of a negative impact.

### 3.667 Farmland

Conversion of farmland to more intensive use was the basis of a negative impact.

### 3.668 Planned Development

Potential for accommodating development and retaining land use contrast within the community was the basis of a positive impact.

### 3.669 Economic Growth

Potential to encourage development of designated industrial and commercial land was the basis of a positive impact.

### 3.6610 Community Character

Retaining land use diversity was the basis of a positive impact.

### 3.6611 Cost Effectiveness

Lowest total cost was the basis of a positive assessment.

### 3.6612 Conformance with PRM's

Demonstrated need was the basis of a positive assessment.

### 3.6613 Local Acceptance

Conformance with local views expressed during EIS project was the basis for a positive assessment.

### 3.6614 Future Provisions

Capability of serving future wastewater needs was the basis of a positive assessment.

### 3.6615 Ease of Management

Centralized decision making and conventional technology was the basis of a positive assessment.

### 3.6616 Individual Expense

Local estimated homeowner costs were the basis of this assessment.

## 3.67 Cost Effective Analysis

Following the rules that are required for cost-effective analysis, total project costs were developed for the alternatives. It should be remembered that they are based on concepts of time and areas that permit the comparison of equals (of apples and apples so to speak). It is required that some of these artificial concepts depart significantly from what the Town is now proposing. This information is useful, however, in exploring basic types of questions that people may have concerning available options. The total costs are shown in Table 3-1.

## 3.68 Public Attitudes

A key element in the North Branford decision making process is the way in which the individual citizen views the issues of the wastewater problem and its solution. Decisions can be effected by simple "yes" or "no" votes as much as by arguments of economics or environmental impacts.

## TABLE 3-1

## SUMMARY OF COST OF ALTERNATIVES

| | Total Present Worth |
|---|---|
| Foxon Area | |
| Alternative A | - See Note |
| Alternative B | $2,740,860 |
| Alternative C | $3,627,400 |
| Alternative D | $8,815,250 |
| Green Acres Area | |
| Alternative A | $ 66,687 |
| Alternative B | $ 605,470 |
| White Hollow Area | |
| Alternative A | $ 946,313 |
| Alternative B | $2,375,340 |
| Alternative C | $3,764,180 |
| Alternative D | $8,413,280 |

NOTE: Present worth costs were not computed when alternative proved infeasible. See Section 3.7

Source. Anderson-Nichols & Co., Inc., 1978 See Appendix C

## TABLE 3-2

## OVERVIEW OF TOTAL IMPACTS ASSOCIATED WITH ALTERNATIVES

+ indicates positive impact
- indicates negative impact
O indicates significant impact

| AFFECTED ENVIRONMENT | Water Resources | | | | Natural Systems | | | Human Resources | | | | Funding Considerations | | Implementation | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Public Health | Aesthetic Factors | Habitat Potential | Future Water Supply | Wetlands | Floodplains | Existing Habitat | Farmland | Planned Development | Economic Growth | Community Character | Cost Effectiveness | Conforms with PRM's | Local Acceptance | Future Provisions | Ease of Management | Individual Expense |
| **Foxon Alternatives** | | | | | | | | | | | | | | | | | |
| On-Site | ⊕ | ⊕ | | | | | | | - | - | + | | + | - | ⊖ | ⊖ | ⊕ |
| Community System | ⊕ | ⊕ | | | - | | - | - | - | - | + | + | + | + | - | - | + |
| Limited Sewer | ⊕ | ⊕ | | - | - | | - | - | ⊕ | + | | | + | ⊕ | + | + | + |
| Full Sewer | ⊕ | ⊕ | - | ⊖ | | | ⊖ | ⊖ | ⊖ | + | ⊖ | | ⊖ | + | ⊕ | + | + |
| **Green Acres Alternatives** | | | | | | | | | | | | | | | | | |
| On-Site | + | + | | | | | | | | | | ⊕ | + | - | - | ⊖ | ⊕ |
| Limited Sewer | + | + | | | | | | | | | | | | + | + | + | - |
| **White Hollow Alternative** | | | | | | | | | | | | | | | | | |
| On-Site | ⊕ | + | | | | | | | + | - | | ⊕ | + | + | - | ⊖ | ⊕ |
| Community System | ⊕ | + | | | | | - | - | + | - | | | + | + | - | - | - |
| Limited Sewer | ⊕ | + | | - | - | | - | ⊖ | - | + | - | | ⊖ | + | + | + | - |
| Full Sewer | ⊕ | + | - | ⊖ | - | | ⊖ | ⊖ | ⊖ | | ⊖ | | ⊖ | + | + | + | - |

The input that was received through the workshops and questionnaire showed that residents of areas that had been identified as problems were less confident in the use of septic systems and more convinced that sewering is the best answer. The role that this attitude would have in the process of actually implementing an alternative must be taken into account. The importance of attitude in the consideration of decentralized systems as workable alternatives is especially relevant since the success of these systems is dependent on the conscious commitment of individual decision makers.

## 3.7 Preferred Alternatives

Based on the preliminary evaluation of the alternative concepts, an effort was made to reduce the possibilities in order to study further those options which seemed most appropriate for each sub-area. Both total costs and environmental impacts were used in determining which alternatives should be retained. An overview of these factors is shown in Table 3-2. This interim screening resulted in the following conclusions.

### 3.71 Foxon Alternative A - Continued On-Site

When this alternative was scrutinized at a closer level, the difficulties of implementing the concept became more obvious. In the Arthur Court area, it would be necessary to build up many of the leaching fields in mounds in order to obtain proper separation from groundwater. In some instances, lot sizes are prohibitive. Under the 1970 Connecticut Public Health Code, an area of 4,500 sq. ft. would be necessary for the active and reserve fields. Of the 67 homes in this area, 33 have lots less than 10,000 sq. ft. With normal setbacks, driveways and separation distances, it would not be possible to provide adequate space on these lots for a standard leaching field. The problem of applying an area-wide program of uniform design criteria in the face of unique individualistic problems is significant. In light of the nature of the physical cause of the problem in this area, and the real problems of implementation in these circumstances, this alternative was eliminated from further study.

## 3.72 Foxon Alternative B - Community Systems

In the preliminary analyses, certain aspects of feasibility were determined. The first requirement is that a leaching site be available in the area. The most promising areas are found along Foxon Road west of the Arthur Court area. There, several large holdings, vacant or only lightly developed, containing good-soils, were found. Because of the location of the problem areas adjacent to Burrs Brook and at different elevations themselves, pumping to the leaching field would be necessary. As documented in Appendix D, this alternative, while initially attractive in terms of assumed low total cost, was ultimately eliminated from consideration because of a more preferable and less costly approach. Because individual costs were so high for the isolated areas such as Miller/Grant Roads or Jerz Lane, the analysis disaggregated the Foxon Area and treated the southern portion near Arthur Court independently from the remote areas.

## 3.73 Foxon Alternative C - Limited Sewer System

This concept is of interest because it approaches the solution of existing problems with a low keyed conventional solution. The distances between the problem areas, however, are not small and a long interceptor would be required. In order to focus on the main problem area of Arthur Court, this alternative too was disaggregated. The result was a project for the southern part of Foxon that was cost-effective and implementable. While the concept basically calls for installing a pipe to solve known or anticipated problems, additional factors require scrutiny. Normal design criteria would not physically restrict a pipe to serve only a specified number of users. While the elements of design must be spelled out in the Facility Plan, various factors that are used are only averages. In practice, the Town could depart somewhat from its original plan when constructing local sewers.

The reasons for this concern about system capacity grow out of past objections to sewering in this area by the State Department of Health and Office of Policy and Management. The basis of their objections was their belief that the sewering that was proposed violated the intent of the State Land Use Policy by encouraging development within a watershed area. While this alternative appears in scale with the problem, further analysis of its potential impact is necessary.

### 3.74 Foxon Alternative D - Full Sewer System

This alternative was carried through the analysis for two reasons. Both relate to the fact that the Town's Proposal for the Initial Foxon System is based ultimately on town-wide sewering. Consequently, the potential costs and environmental impacts of this concept should be known when evaluating the Town's Proposal.

### 3.75 Green Acres Alternative A - Continued On-Site

The problem of high groundwater in this area could be overcome by building up the leaching fields. Lot sizes are probably sufficient to accommodate a standard designed system. Given the general openess of the area, the mounds would have an aesthetic impact in that they would be visible as a modification on the previous surface which in this area would be a lawn. This alternative, because of low cost, is worthy of further consideration.

### 3.76 Green Acres Alternative B - Limited Sewer

Because of this area's proximity to a nearby interceptor in North Haven and chronic problems with the local use of septic systems, the Town has developed a plan to sewer the area. This alternative was evaluated in terms of cost and found to be considerably more expensive to users than in the B Area. This is due to large lot size and differences in grant eligibility. This project was, however, backed by the Town Council/Sewer Authority in their statement at the third workshop. In light of the uncertainties of the on-site alternative and the general interest in sewering that has been expressed for this area, this alternative, along with modifications, will be further analyzed.

### 3.77 White Hollow Alternative A - Continued On-Site

From the general observation of the EIS field engineers, it would appear that many of the problems in this area could be rehabilitated. In many instances, the original fields were constructed on terraces which may only have to be extended. Because an area-wide rehabilitation program may be feasible under the new direction of the grant program, an option not available in the past, this alternative should be studied further.

### 3.78 White Hollow Alternative B - Community System

The general feasibility of this alternative was determined by first locating potential leachfield area. In two locations along Durham Road, large holdings of open land with suitable soils exist. Potential sites exist immediately to the south, west of the Durham Road/Reeds Gap Road intersection and to the north, east of the White Hollow Road/Durham Road intersection, large enough to provide either a single leaching field or a pair of fields. In both instances, the problem areas (Sky Lark Drive Area and Walnut Lane Area) could be served by means of a gravity sewer. This alternative warrants further study.

### 3.79 White Hollow Alternative C - Limited Sewer Systems

This concept solved the problem of the failing septic systems by extending a sewer system from the Green Acres along the Farm River to the White Hollow Area. While it was felt that this approach would be expensive, the costs were developed nonetheless to provide a basis for comparison when evaluating alternatives. The alternative itself was dropped from further analysis due to high total and individual costs and environmental impacts. The basic issue of the stimulation of development within the Farm River watershed is described in detail in the evaluation of impacts on the lower valley under the Foxon Concept.

### 3.710 White Hollow Alternative D - Full Sewer System

This alternative was analyzed to determine how the costs of a complete system might affect individual costs. It was found that the individual costs remained high in addition to the high overall costs. Costs combined with environmental impacts eliminated this alternative from further consideration.

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# TABLE OF CONTENTS

PAGE

## SECTION 1.0 - SUMMARY

1.1 General Discussion........................ 3 1/B8
1.2 Federal and State Programs.............. 3 1/B8
1.21 P.L. 92-500............................. 5 1/B10
1.22 Construction Grants Program............ 5 1/B10
1.23 PRM 78-9................................ 6 1/B11
1.24 1977 WPCA Amendments.................... 6 1/B11
1.25 State Program and Responsibilities...... 7 1/B12
1.3 Local Involvement........................ 8 1/B13
1.31 Town Plan of Development................ 9 1/B14
1.32 Town Sewer Plans........................ 9 1/B14
1.33 Environmental Review Process............ 11 1/C2
1.4 EIS Work Program......................... 12 1/C3
1.41 Issues.................................. 12 1/C3
1.42 Public Participation Program............ 15 1/C9
1.421 Newsletters............................ 15 1/C9
1.422 Questionnaire.......................... 16 1/C10
1.423 Workshops.............................. 17 1/C11
1.43 General Data Collection................. 18 1/C12
1.44 EIS Field Work.......................... 18 1/C12
1.441 Windshield Surveys..................... 19 1/C13
1.442 Connecticut DEP Survey................. 19 1/C13
1.443 Follow-up Survey....................... 20 1/C14
1.444 Water Quality Sampling................. 21 1/D1
1.5 Overview of Analysis of Alternatives..... 25 1/D9
1.51 General Alternative Concepts............ 27 1/D11
1.52 Potential Impacts of Alternatives....... 27 1/D11
1.53 Screening of Alternatives............... 28 1/D12
1.54 Conclusions............................. 29 1/D13

## SECTION 2.0 - PURPOSE AND NEED

2.1 Precipitating Action..................... 33 1/E3
2.2 EIS Findings............................. 33 1/E3
2.3 EIS Recommendations...................... 33 1/E3

# TABLE OF CONTENTS (Cont'd)

PAGE

## SECTION 3.0 - ALTERNATIVES INCLUDING THE PROPOSED ACTION

3.1 General Discussion of Alternatives...... 37 1/E7
3.2 No Action.............................. 37 1/E7
3.3 On-Site Solutions...................... 37 1/E7
3.31 Changes in Use of the Existing Septic Systems.......................... 38 1/E8
3.32 Repairs to Septic Systems.............. 39 1/E9
3.33 Expansion of Existing Systems.......... 39 1/E9
3.34 Replacement of the Leaching Field....... 39 1/E9
3.35 Site Modification/Curtain Drains........ 40 1/E10
3.36 Mounded/Pumped Systems................. 40 1/E10
3.37 Summary................................ 41 1/E11
3.4 Local Sewer Systems.................... 41 1/E11
3.5 Town-Wide Sewer System................. 42 1/E12
3.6 Development of Alternatives for North Branford.......................... 43 1/E12
3.61 Problem Areas.......................... 43 1/E12
3.62 Alternative Concepts................... 47 1/F6
3.63 Foxon Area Alternatives........... ..... 48 1/F7
3.631 Foxon Alternative A - Continued On-Site................................ 49 1/F8
3.632 Foxon Alternative B - Community System................................. 49 1/F8
3.633 Foxon Alternative C - Limited Sewer System.......................... 49 1/F8
3.634 Foxon Alternative D - Full Sewer System................................. 49 1/F8
3.64 Green Acres Area Alternatives.......... 53 1/F12
3.641 Green Acres Alternative A - Continued On-Site...................... 53 1/F12
3.642 Green Acres Alternative B - Sewer System.......................... 53 1/F12
3.65 White Hollow Area Alternatives.......... 55 1/F14
3.651 White Hollow Alternative A - Continued On-Site...................... 55 1/F14
3.652 White Hollow Alternative B - Community Systems...................... 55 1/F14
3.653 White Hollow Alternative C - Limited Sewer System.................. 55 1/F14
3.654 White Hollow Alternative D - Full Sewer System..................... 55 1/F14

TABLE OF CONTENTS (Cont'd)

PAGE

3.66 Potential Impacts of Alternatives....... 59 1/G4
3.661 Public Health.......................... 59 1/G4
3.662 Aesthetics............................. 59 1/G4
3.663 Potential Habitat...................... 59 1/G4
3.664 Future Water Supply.................... 60 1/G5
3.665 Wetlands............................... 60 1/G5
3.666 Existing Habitat....................... 60 1/G5
3.667 Farmland............................... 60 1/G5
3.668 Planned Development.................... 60 1/G5
3.669 Economic Growth........................ 60 1/G5
3.6610 Community Character.................... 60 1/G5
3.6611 Cost Effectiveness..................... 60 1/G5
3.6612 Conformance with PRM's................. 61 1/G6
3.6613 Local Acceptance....................... 61 1/G6
3.6614 Future Provisions...................... 61 1/G6
3.6615 Ease of Management..................... 61 1/G6
3.6616 Individual Expense..................... 61 1/G6
3.67 Cost Effective Analysis................ 61 1/G6
3.68 Public Attitudes....................... 61 1/G6
3.7 Preferred Alternatives................. 64 1/G10
3.71 Foxon Alternative A - Continued On-Site................................ 64 1/G10
3.72 Foxon Alternative B - Community System................................. 65 1/G11
3.73 Foxon Alternative C - Limited Sewer System.......................... 65 1/G11
3.74 Foxon Alternative D - Full Sewer System................................. 66 1/G12
3.75 Green Acres Alternative A - Continued On-Site...................... 66 1/G12
3.76 Green Acres Alternative B - Limited Sewer System................... 66 1/G12
3.77 White Hollow Alternative A - Continued On-Site...................... 67 1/G13
3.78 White Hollow Alternative B - Community System...................... 67 1/G13
3.79 White Hollow Alternative C - Limited Sewer System................... 67 1/G13
3.710 White Hollow Alternative D - Full Sewer System...................... 67 1/G13

## TABLE OF CONTENTS (Cont'd)

PAGE

## SECTION 4.0 - AFFECTED ENVIRONMENT

4.1 Natural Environment.......................... 71 2/A10
4.11 Topography/Hydrology.......................... 71 2/A10
4.12 Geology/Soils.......................... 72 2/A11
4.13 General Water Quality.......................... 79 2/B10
4.14 Climate.......................... 81 2/B12
4.15 Air Quality.......................... 81 2/B12
4.16 Sensitive Ecological Systems.......................... 82 2/B13
4.2 Human Environment.......................... 83 2/B13
4.21 General Land Use.......................... 84 2/C1
4.211 History.......................... 84 2/C1
4.212 Patterns.......................... 85 2/C2
4.213 EPA Resource Inventory.......................... 89 2/C9
4.22 Land Use Regulation.......................... 90 2/C10
4.221 Water Company Lands.......................... 91 2/C11
4.222 Zoning.......................... 92 2/C12
4.223 Wetland Regulations.......................... 96 2/D5
4.224 Floodplain Regulations.......................... 97 2/D6
4.225 Agricultural Preservation.......................... 101 2/D13
4.3 Growth & Development.......................... 103 2/E1
4.31 Population Projections.......................... 103 2/E1
4.32 Local Plan of Development.......................... 105 2/E3
4.33 Regional Plan.......................... 107 2/E5
4.34 State Plan of Conservation & Development.......................... 110 2/E8
4.35 Local Perceptions of Growth.......................... 113 2/E11
4.4 Characteristics of Resource Use.......................... 114 2/E12
4.41 Water Supply.......................... 114 2/E12
4.411 General.......................... 114 2/E12
4.412 New Haven Water Company.......................... 116 2/E14
4.413 Water Quality.......................... 118 2/F2
4.42 Wastewater Disposal.......................... 121 2/F5
4.421 Past and Current Practices.......................... 121 2/F5
4.422 Continuing Limitations.......................... 122 2/F6

# TABLE OF CONTENTS (Cont'd)

PAGE

## SECTION 5.0 - ENVIRONMENTAL CONSEQUENCES

5.1 General Discussion.......................... 125 2/F9
5.2 No Action.................................. 128 2/F12
5.21 Future Development Scenario............... 129 2/F13
5.22 Impacts on Water Resources................ 131 2/G1
5.221 Public Health............................ 131 2/G1
5.222 Future Water Supply...................... 133 2/G3
5.23 Impacts on Natural Systems................ 134 2/G4
5.231 Wetlands................................. 134 2/G4
5.232 Existing Habitat......................... 134 2/G4
5.24 Impacts on Human Resources................ 135 2/G5
5.241 Farmland................................. 135 2/G5
5.242 Planned Development...................... 136 2/G6
5.243 Economic Growth.......................... 137 2/G7
5.244 Community Character...................... 137 2/G7
5.3 Town Proposal & Concept for
Foxon Area..................................... 138 2/G8
5.31 Impacts on Water Resources................ 139 2/G9
5.311 Public Health............................ 139 2/G9
5.312 Future Water Supply...................... 140 2/G10
5.32 Impacts on Natural Systems................ 141 2/G11
5.321 Wetlands................................. 141 2/G11
5.322 Existing Habitat......................... 142 2/G12
5.33 Impacts on Human Resources................ 142 2/G12
5.331 Farmlands................................ 142 2/G12
5.332 Planned Development...................... 143 2/G13
5.333 Economic Growth.......................... 144 2/G14
5.334 Community Character...................... 145 3/A8
5.4 Modified Foxon Proposal.................... 146 3/A9
5.41 Impacts on Water Resources................ 147 3/A10
5.411 Public Health............................ 147 3/A10
5.412 Future Water Supply. .................... 148 3/A11
5.42 Impacts on Natural Systems................ 148 3/A11
5.421 Wetlands................................. 148 3/A11
5.422 Existing Habitat......................... 149 3/A12
5.43 Impacts on Human Resources................ 149 3/A12
5.431 Farmlands................................ 149 3/A12
5.432 Planned Development...................... 150 3/A13
5.433 Economic Growth.......................... 150 3/A13
5.434 Community Character...................... 151 3/A14

TABLE OF CONTENTS (Cont'd)

PAGE

5.5 Green Acres Area Rehabilitation......... 151 3/A14
5.51 Impacts on Water Resources.............. 152 3/B1
5.511 Public Health........................... 152 3/B1
5.512 Future Water Supply..................... 152 3/B1
5.52 Impacts on Natural Systems.............. 152 3/B1
5.53 Impacts on Human Resources.............. 152 3/B1
5.531 Farmlands............................... 152 3/B1
5.532 Planned Development..................... 153 3/B2
5.533 Economic Growth......................... 153 3/B2
5.534 Community Character..................... 153 3/B2
5.6 Green Acres Area Sewer Systems.......... 153 3/B2
5.61 Impacts on Water Resources.............. 154 3/B3
5.611 Public Health........................... 154 3/B3
5.612 Future Water Supply..................... 154 3/B3
5.62 Impacts on Natural Systems.............. 154 3/B3
5.621 Wetlands................................ 154 3/B3
5.622 Existing Habitat........................ 155 3/B4
5.63 Impacts on Human Resources.............. 155 3/B4
5.631 Farmland................................ 155 3/B4
5.632 Planned Development..................... 155 3/B4
5.633 Economic Growth......................... 155 3/B4
5.634 Community Character..................... 156 3/B5
5.7 White Hollow Area Rehabilitation........ 156 3/B5
5.71 Impacts on Water Resources.............. 156 3/B5
5.711 Public Health........................... 156 3/B5
5.712 Future Water Supply..................... 157 3/B6
5.72 Impacts on Natural Systems.............. 157 3/B6
5.721 Wetlands................................ 157 3/B6
5.722 Existing Habitat........................ 157 3/B6
5.73 Impacts on Human Resources.............. 157 3/B6
5.731 Farmland................................ 157 3/B6
5.732 Planned Development..................... 157 3/B6
5.733 Economic Growth......................... 157 3/B6
5.734 Community Character..................... 158 3/B7

## TABLE OF CONTENTS (Cont'd)

PAGE

5.8 White Hollow Area Community Sewer....... 158 3/B7
5.81 Impacts on Water Resources.............. 158 3/B7
5.811 Public Health........................... 158 3/B7
5.812 Future Water Supply..................... 159 3/B8
5.82 Impacts on Natural Systems.............. 159 3/B8
5.821 Wetlands................................ 159 3/B8
5.822 Existing Habitat........................ 160 3/B9
5.83 Economic Growth......................... 160 3/B9
5.84 Community Character..................... 161 3/B10
5.9 Conclusions............................. 161 3/B10
5.91 Foxon Area.............................. 161 3/B10
5.911 Impacts Which Cannot Be Avoided......... 167 3/C4
5.912 Mitigative Measures..................... 169 3/C5
5.92 Green Acres Area........................ 168 3/C5
5.921 Impacts Which Cannot Be Avoided......... 170 3/C7
5.922 Mitigative Measures..................... 170 3/C7
5.93 White Hollow Area....................... 170 3/C7
5.931 Impacts Which Cannot Be Avoided......... 171 3/C8
5.932 Mitigative Measures..................... 171 3/C8
5.94 Areawide................................ 172 2/C9

SECTION 6.0 - LIST OF PREPARERS 173 3/C10

APPENDIX A PUBLIC PARTICIPATION 3/D2

APPENDIX B WATER QUALITY SAMPLING 3/E6

APPENDIX C DESCRIPTION & ECONOMICS OF ALTERNATIVES 4/A10

APPENDIX D DETERMINATION OF WASTEWATER NEED 4/E12

APPENDIX E BIBLIOGRAPHY 4/G4

# SECTION 4.0

# AFFECTED ENVIRONMENT

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The information that the EIS project team has collected concerning the environment of North Branford is condensed in this section. This is the data base which served as the reference from which the environmental impacts were identified and evaluated. It is basically an information source containing summaries and interpretations of reports, studies, and interviews which constitute the body of knowledge acquired in the course of the EIS project.

It is possible that additional information recently has been developed or that older historical perspectives have been overlooked. The public review period after the publication of the Draft EIS will provide for an opportunity for expanding this data base to include any omissions.

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## 4.1 Natural Environment

In this section the basic environmental inventory relating to physical conditions in North Branford has been developed. The purpose in including this section is not to list all the facts that are known about the local environment, but rather to point out those aspects of the physical setting which appear to relate to wastewater disposal. Both current practices using on-site treatment by septic system and the likely range of alternatives were considered when this section was developed.

### 4.11 Topography/Hydrology

The topography in North Branford is very hilly, with elevations varying from about 40 ft. above sea level in the river valley to over 550 ft. above sea level in the Totoket Mountain Range around Lake Gaillard. (Figure 4-1) The most striking natural features of the landscape are the ridges which generally run in a northeast to southwest direction. It was the damming of a stream between two of these ridges that formed the bowl which is now occupied by Lake Gaillard. This bowl-like appearance is strengthened by the fact that the western slopes of these ridges are much steeper than those in the east. Consequently, the "edge" of the bowl as seen from Forest Road is sharply defined.

The Farm River Valley, which is widest in the southwest part at North Branford near Route 80, extends northward through Northford Village, and then curves eastward, gradually narrowing, until it ends near the Guilford Town Line in the White Hollow area. These two elements, the lake basin and its ridges, coupled with the Farm River Valley form the most conspicuous natural formations.

The ridges form several drainage basins which are important to this study. In addition to the Farm River just described, these basins include the northwest corner of Town which drains into North Haven through the Muddy River, and the southeast portion of Town around North Branford center, which drains southward into Branford through the Branford River (Figure 1-4).

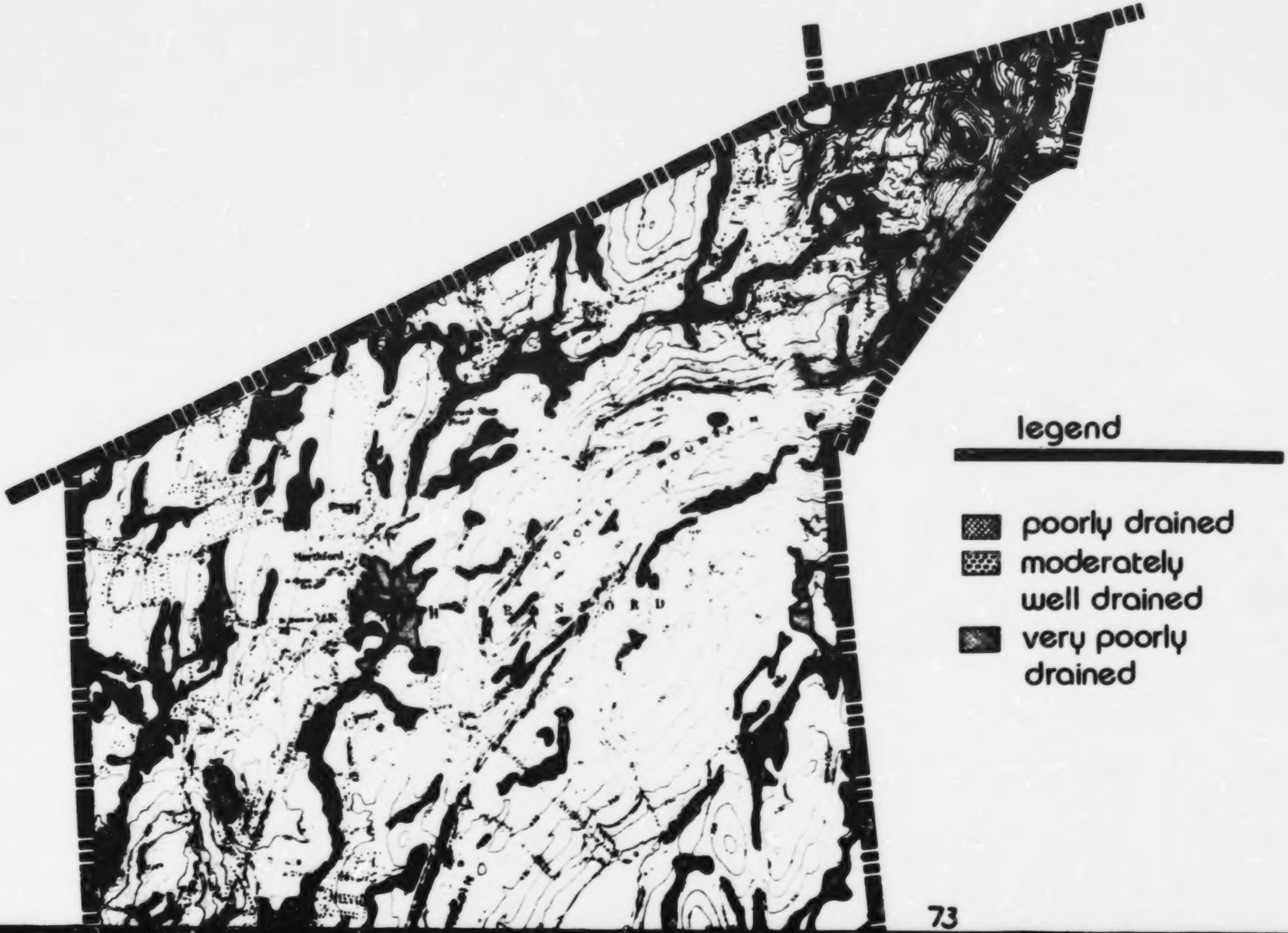
The topography and drainage pattern has had a role in North Branford's wastewater disposal problems and in the solution of those problems. Development has occurred frequently on extremely steep slopes where the proper construction of septic systems is difficult. Under these circumstances, a level field, set back from the slope is necessary but difficult to obtain without considerable effort. The problems frequently encountered include drowning of the field by drainage from the uphill lot or break-out of the wastewater on the down hill edge of the leachbed when cover is thin. These types of problems were evident in the Brook Lane, Walnut Lane, and Sky Lark Drive areas.

Another problem created by the development on hillsides involves the disturbance of natural soil. In an effort to level the overall lot, the builder often cuts into the hill behind the house and fills in front, creating a small terrace. Often the disturbed soil, or sub-soil that is brought in as fill, has not been chosen for its ability to accept wastewater for the leaching field.

The recent revision of North Branford's zoning reflects concern for developing land on steep slopes. Most of the steepest slope areas have been zoned for two acre lot sizes. This should give the builder more opportunities to develop a properly operating leach field. Under the No Action alternative and under the alternative of Continued On-Site Treatment where sewers are not planned for, new septic system designs will continue to come under the review of the East Shore Health District. While these factors should reduce the effect that topography has had in creating local wastewater disposal problems in the past, alone they do not guarantee elimination of any future problems. Site design review is most often limited to the actual leachfield itself with minimal consideration of the general landscape of the area. Thus, washout of the field from up-slope drainage may continue.

## 4.12 Geology/Soils

The bedrock geology of the area consists of two distinct types. A major fault, the triassic border fault, runs through Cedar Pond, the village area of North Branford and along Munger Brook. Northwest


legend
▨ poorly drained
▨ moderately well drained
▨ very poorly drained
Northford
BRANFORD

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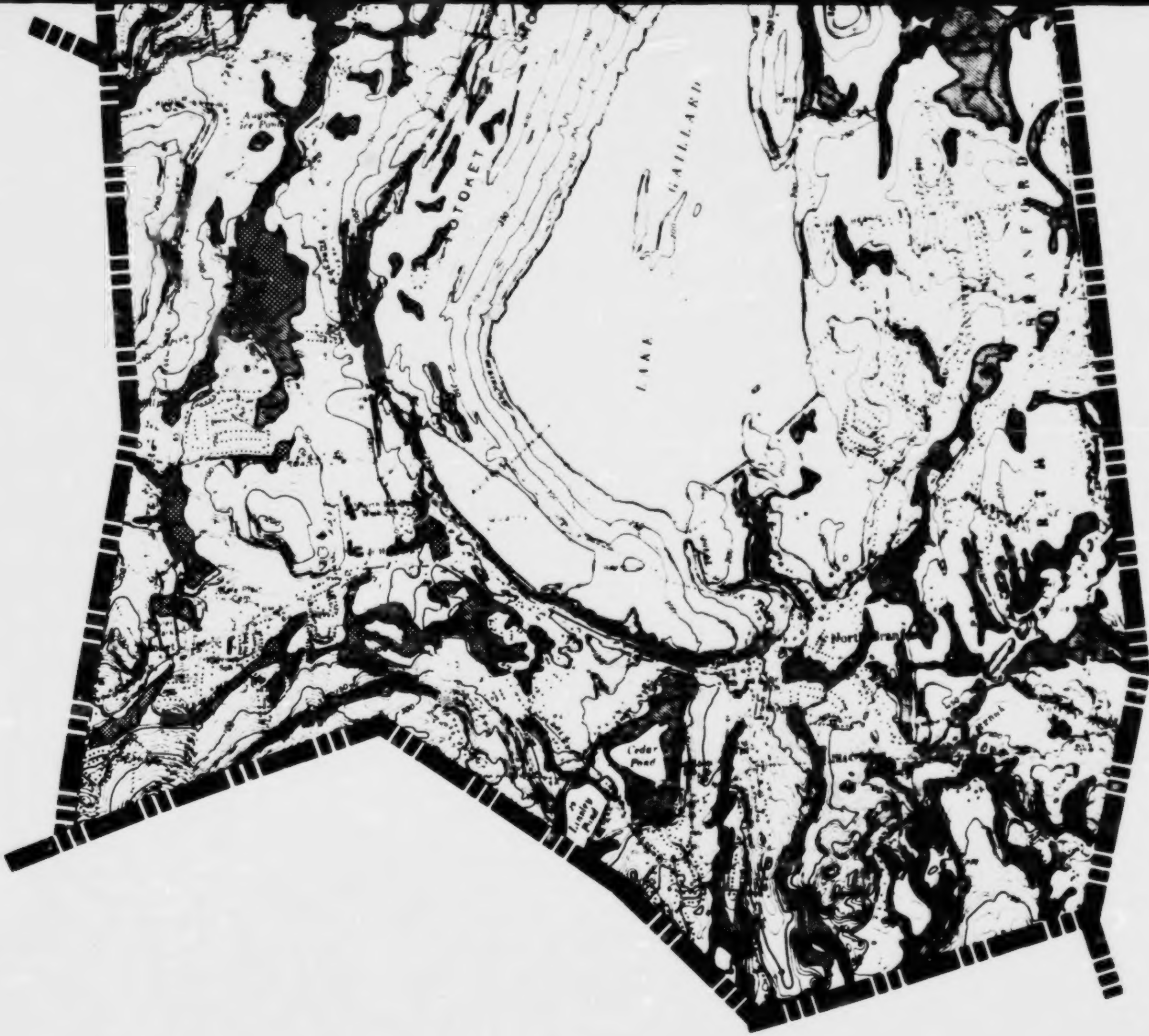

TOTOKET
LAKE GAILLARD
BRANFORD
North Branford
Cedar Pond
0 1600 3200

**wetlands / topography**

**figure 4-1**

north branford wastewater treatment facilities

date: february 1979

source: inland wetlands commission / u.s. geological survey

environmental impact statement ■ environmental protection agency

anderson-nichols & co., inc. technical consultant

of this fault, the bedrock consists of sedimentary rocks (sandstones, shales) which are evident in the distinctive red and brown sands that are seen everywhere. South of the fault, metamorphic rocks, granites and gneisses, more typical of the New England area are found. The bedrock geology of the area is of significance to the EIS because of its effect on the general topography and also its possible influence on the characteristics of local groundwater.

The prominant ridges of North Branford are the tilted beds of sedimentary rock. They are commonly called traprock ridges because of the resistant basalt (traprock) that occurs between layers of sandstone. The most significant effect of bedrock for this project is the steep slope that is produced on the western side of Totoket Mountain. When the factor of this slope is combined with the typical cover material, described below, severe development restrictions may be present.

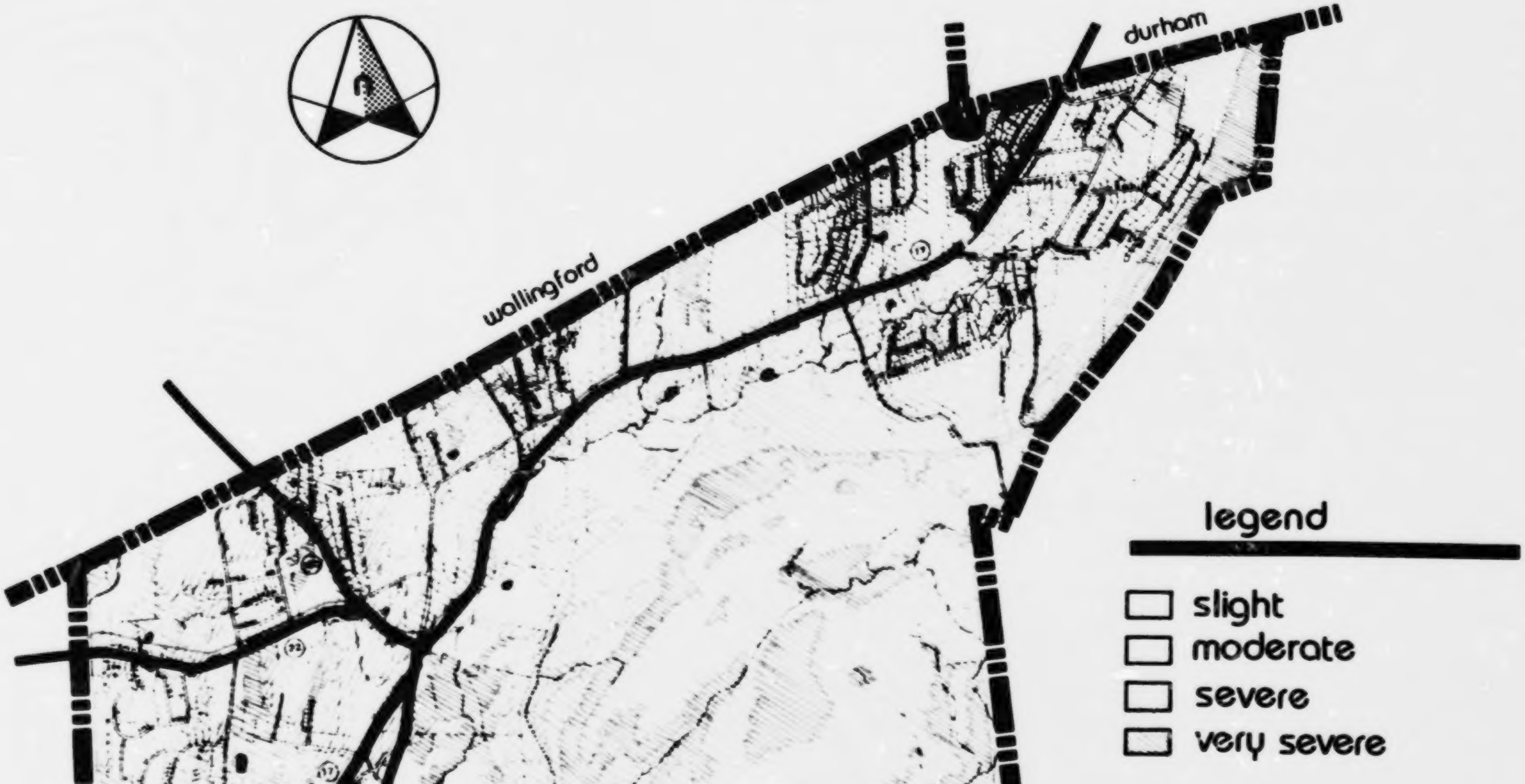
Two types of material remain as cover material (overburden) since the glacial ages, over the bedrock. Over the hilly areas, till, the unsorted mixture of sands, stones, and fine clay-like particles, occurs in varying thickness. This material is usually not well drained. In the valleys, particularly the Farm River Valley, layered sandy material, stratified drift, is found. While this particular material (ice-contact stratified drift) varies considerably from place to place, it is usually well drained.

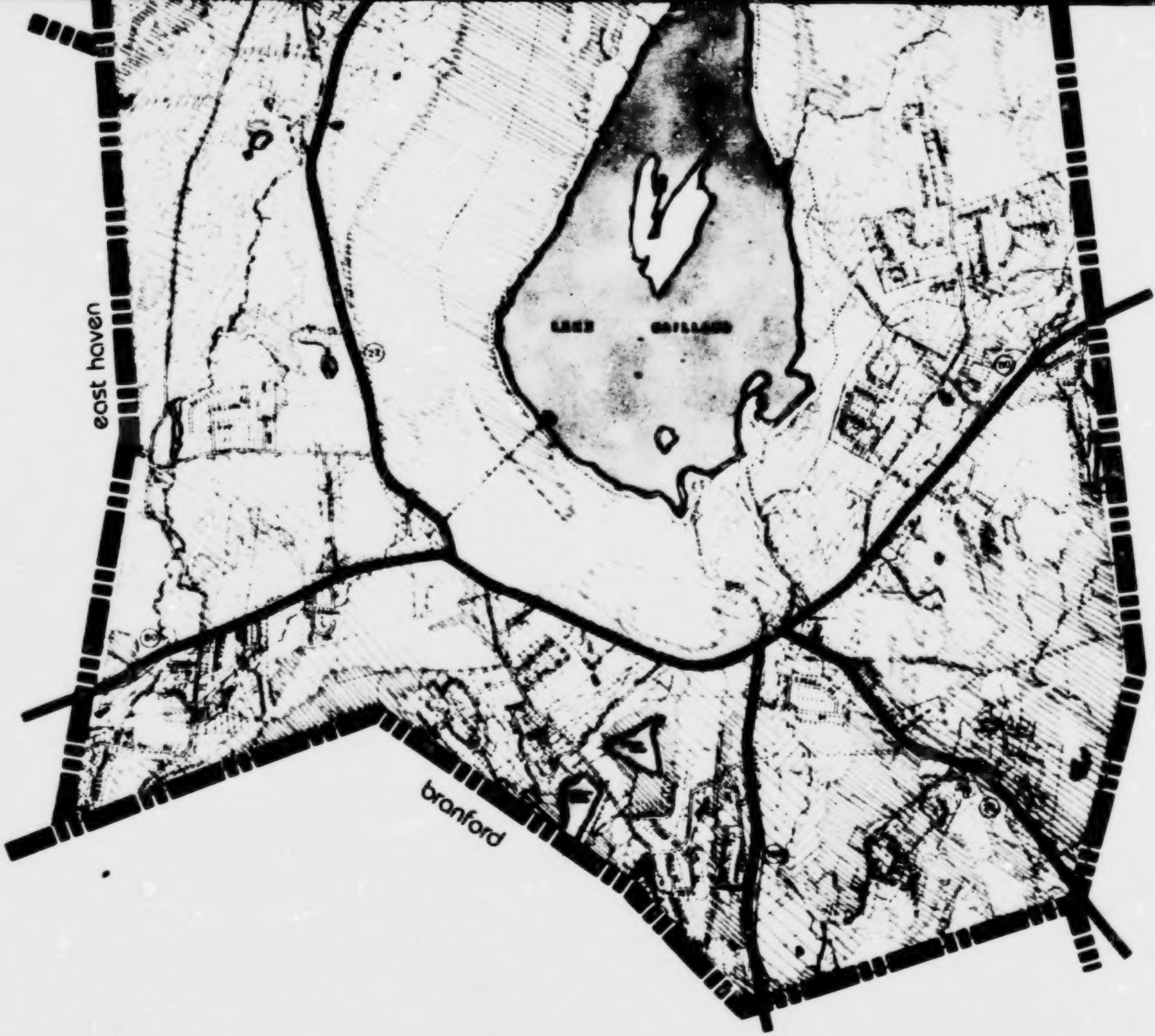
The effects of the combination of bedrock and overburden on wastewater disposal are illustrated by the fact that on steep slopes, water remains near or at the surface as it drains to the valley below. When this physical limitation is combined with common hillside development patterns seen in North Branford, wastewater disposal problems can be widespread. Problems in the White Hollow area and the newer section of Brook Lane appear to have these conditions as their cause.

More detailed information is available through the soils data that has been developed for the area. General soil types have been mapped by the Soil Conservation Service for North Branford. This information is available in two formats from the agency's Wallingford Office. The two forms are 2 large Town maps dated 1969 and a more recent set of photo-maps. The former can be used to obtain a general picture of soils throughout North Branford but is lacking in reference points which could be used to find specific locations. The photos, though only available in Xerox form, show street patterns and homes and enable the user to find soil types at more exact locations. (The reader should be aware of the general nature of these maps and their limited utility when applied to small areas.)

The SCS also has a number of interpretive guides to soil types and their uses. One category is that of septic system limitation. Individual soils have been evaluated in terms of the presence of factors such as groundwater, bedrock and permeability to arrive at general assessments of these limitations for the use of septic systems. This general classification of North Branford's soils is shown here as Figure 4-2. One immediate limitation that should be apparent is that large areas of particular interest have been left unclassified. In areas of extensive residential subdivision, where the original soil cover has been altered by earth moving, the SCS has assigned the designation of "built land". Thus, the SCS mapping is more applicable as a planning guide for future development rather than an explanation of existing septic system problems in developed areas.

In general, the SCS map shows that the better soils are located in the river valley (except for lower wetlands) while those soils on the slopes have been classified as limited. The level lowland soils are generally the sandy soils that developed over the glacial sand described earlier. In the uplands, several types of problems including shallow bedrock, shallow groundwater, and the presence of clay layers (hard pan) result in the SCS classification of "limited".


durham
wallingford
north haven
guilford
legend
slight
moderate
severe
very severe


east haven
LAKE GAILLARD
branford

general limitations for septic system use

figure 4-2

north branford wastewater treatment facilities

date: february 1979

source: soil conservation service

0 1600 3200

environmental impact statement ■ environmental protection agency

anderson-nichols & co., inc.

774

technical consultant

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While this map is of general interest in describing the area, its application is limited both by the nature of the data on which it is based, and on the generalized method of interpretation of limitation that is used. In Appendix D in this report, the specific factors that may limit septic system use are broken out as Figures D-1 through D-5. This detailed information was used as part of the analysis in determining or verifying the cause of wastewater problems, and in the selection of feasible alternatives for the identified problem areas. For the purposes of the EIS, land was considered undevelopable for use with septic systems only where two of the individual constraints, mapped in Appendix D, appear together on the same lot. It was assumed that a lot with a single constraint could ultimately be developed using an engineered septic system.

## 4.13 General Water Quality

In general, the water quality appears to be of mixed quality. Both the major streams, the Farm and Branford Rivers, have significant portions where the hilly terrain maintains good velocity and the water appears clear and odorless. Fish are found well upstream in both areas. In these areas, the water maintains good aeration capabilities and consequently good assimilative capacity for waste material. In most areas of North Branford, the dissolved oxygen content of the streams was at or near saturation. (USGS data set) During the EIS field survey, the values that were found for BOD (a measure of decomposing material requiring oxygen) were so low the testing was changed to measure COD (a measure of all potential material needing decomposition). Low COD values were also found indicating low waste volumes in the water. This may be due to dilution effects, assimilative effects, the chance nature of sampling, or a combination of all these. One noticeable problem, however, in the Farm River especially, is the significant clouding and sedimentation that occurs after heavy rainfall. This problem is not evident in the Branford River due to the different geology and soils.

In the flatter sections of the streams where water movement is slow, the appearance of the water changes. While algae and swamp conditions may naturally change the water's appearance and odor, the coincidence of densely settled subdivisions such as those along Burrs Brook south of Route 80 have raised suspicion that the quality of the water is being adversely affected by development. This opinion has also been expressed by the Town and its consultants during previous sewer need evaluations where high bacterial measures were recorded.

As part of the EIS, an extensive effort was conducted to compile a water quality data base from existing information and from actual field data collection in order to document the extent of pollution that may be occurring from these sources. The complete data set and site specific analysis are contained in Appendix B.

The basic findings (briefly discussed in Section 1.444) were that at any given time, high bacterial counts were found almost everywhere. This may be, however, a limitation of the tests which do not conclusively discriminate between animal and human wastes. The chemical analysis for nutrients, nitrates and phosphates, are also unclear as to specific cause. First, the actual values for these two substances are not in violation of any standard or law. Phosphate values are very low, in fact.

The nitrate values, while not in violation of any standard, were somewhat higher than expected. A second look at the data revealed that the spatial pattern of values found in the surface waters, which might reflect septic system contamination, were similar to the spatial distribution of deep well water samples which are less likely to be affected by short term or surface contamination. The spatial distribution revealed that the nitrates in the Farm River Valley were higher than those found in the Branford River area. These two areas vary significantly in their basic geology. Also, much more farming activity (a potential source of nitrates) occurs in the Farm River Valley. The conclusions were that the highest values (whether a standard was violated or not) were found in those places where problems with septic systems were reported. (See Appendix B)

## 4.14 Climate

The climate of the area is described as humid continental. What this simply means is that precipitation, rain and snow, is fairly ample and evenly distributed throughout the year, and summers are warm and winters cool. Hidden, of course, in this type of description is the day-to-day variability - the droughts, the "monsoons", the blizzards - which most people tend to remember.

The most significant climatic factor, for this study, is precipitation. During the spring, when the ground is frozen, the rapid melting of snow cover, coupled with prolonged period of rainfall, creates an abundance of surface and sub-surface water which aggravates the performance of many septic systems. Similar conditions can also occur in the fall when tropical storms may travel through the area.

In order to protect public health, most testing of site conditions of septic systems such as percolation testing or inspection of the operation of existing systems is now done in the spring. The belief is that if on-site disposal operates during the worst conditions, it will work throughout the year. The problem of issuing permits for septic systems during exceptionally dry years remains however. If the groundwater observation made during the dry year is low enough, the possibility exists that in some instances the leach field may fail. Limitations of the permit process are described in Section 4.42.

## 4.15 Air Quality

In response to the Federal Clean Air Act of 1972, the State Department of Environmental Protection has established four Air Quality Control Regions and adopted standards for six pollutants within these areas. North Branford falls within the Hartford-New Haven-Springfield Interstate AQCR and must meet primary (health) and secondary (welfare) standards for particulates, sulfur oxides, nitrogen dioxide, photochemical oxidants (ozone), hydrocarbons, and carbon monoxide. Because, in part, of the location of densely populated areas and industry, the region has often been in violation of many of the standards. Because of North Branford's location with respect to New Haven, it is expected that values in Town are lower than those in the city, but high, nonetheless, when air flows from the southwest as it tends to do in the summer.

In suburban towns like North Branford, the chief concern is usually with ozone which is derived from automobile-exhaust and contributes to smog conditions. It has been assumed that intense development will create worse conditions. It should be noted that air quality problems may be due to dirty air that blows in from neighboring states. This issue has recently resulted in a suit by three Connecticut groups against the implementation of Clean Air Standards. Because of this "down wind" effect, it is contended that well over half of the pollutants measured locally are from out-of-state. It is argued that efforts to limit local development to attempt to meet the standards will not only economically handicap the area, but also will be futile in terms of air quality goals.

The air quality issue has not been considered as central to this EIS for several reasons. No direct impact is expected because no new treatment facility is planned. Because of the general regional conditions of existing background conditions just described, no effort will be made to analyze possible secondary effects of induced development. The only conceivable air quality issue that might be discussed is that of odor which has been lumped into the aesthetic category in this study.

### 4.16 Sensitive Ecological Systems

Vegetation varies with climate, geology, and soil type. Since it is both the immediate or the ultimate source of all food and most of the shelter required by wildlife, the type of vegetation present in an area is closely related to types of wildlife likely to be present. Food, shelter, and water, the essential needs of wildlife are plentifully available in North Branford.

Connecticut has been divided into eleven major ecoregions reflecting climate, vegetation composition and pattern, soils, and the presence or absence of indicator species and species groups. The majority of North Branford is in the southeast corner of the South-Central lowlands ecoregion.

Within this ecoregion, the major forest vegetation is Central Hardwoods-Hemlock, and is typical of the Oak-Hickory or Oak-Yellow Poplar forest zones of eastern United States. Prevailing trees include White, Red, and Black Oaks, various Hickories, Poplar, Black Birch, White Ash and Hemlock. Old-field succession is dominated by Red Cedar, rather than White Pine.

Rare or unusual plant species and communities are found on traprock ridges which are the most significant habitat types found in North Branford. Many of the states rare species are found only on the ridges. The associated talus slopes once supported diverse flora. Cliff-nesting birds such as the Peregrine Falcon once inhabited the area. Currently, wide-ranging animals can roam freely with little disturbance on the steep slopes. Northern copperheads and timber rattlesnakes may also be present on the ridges. Rare plants include mountain sandwort, yellow corydalis, wild comfrey, and small-flowered leafcup. The five-lined skink is a rare vertebrate of the region but is not listed as a rare or endangered species by the U.S. Fish and Wildlife Service.

Within the Town, most of the ridge ecosystem remains beyond the reach of development. Much of it falls within the protected area of the Water Company lands or is too steep for any development. Some exceptions do exist in the White Hollow area. In the past, some development has occurred on the slope of the ridge. Under today's climate of greater concern for proper septic system functioning, it is unlikely that the same steep slopes could be developed. Recently, however, some development has actually occurred on the ridge. The difficulty of developing this area of thin soils has been reflected in the new two acre zone, that is found there, and may act as a retardent to extensive development. In any case, those areas lie well beyond the areas of anticipated development that is of concern to the EIS.

## 4.2 Human Environment

In addition to these areas of the "natural environment" just described, the EIS is required to evaluate the impacts of alternatives on the general socio-economic environment as well. Often the impacts in this area are of more interest because they affect the personal every day life of residents. Taxes, utility bills, and changes in the neighborhood are areas of universal concern. In the sub-sections that follow, emphasis has been placed on land use, land use plans, and resource use.

## 4.21 General Land Use

### 4.211 History

New Haven has been the central city of the region in which North Branford is located since early in the 17th Century. Downtown New Haven is currently a fifteen minute drive from North Branford. For several centuries, what is now North Branford was an outlying agricultural district. The Town was incorporated as a separate entity from Branford in 1931. It is approximately 25 square miles in extent or 17,152 acres.

Because regional industry located elsewhere, near rivers first, and later along major modes of transportation, an agricultural and rural character persisted longer in North Branford than in more diversified neighborhoods. A major exception was extraction of traprock from Totoket Mountain for which a special rail line was built directly to the coast. The New Haven Trap Rock Company currently has holdings of about 735 acres adjacent to water company land. The railroad continues to serve the quarry and is also available to several industrial sites.

Significant farm abandonment occurred in North Branford during the 19th Century as it did all over in New England. The poorest land for agricultural purposes reverted to forest earliest. Large tracts of former farmland became available. The New Haven Water Company purchased Lake Gaillard and approximately 6,000 acres of surrounding watershed lands. To the present day, one third of the area of the Town is committed to this single land use category.

The subsequent land use pattern has evolved from conversion of remaining agricultural and forested land. The largest tracts of remaining agricultural land are located in the Farm River Valley. However, several subdivisions have made incursions into the valley in the last 20 years.

Major subdivision development has occurred in the south and north. Subdivisions are located south and southeast of Lake Gaillard and north and northwest of Lake Gaillard in the Farm River Valley. Thus, two distinct centers have emerged separated by water company land and farmlands in the valley. Northford is the northern and more historic center. North Branford is the southern and more recently developed center. Route 22 (Forest Road) and Totoket Road connect the two centers. The focus of the Northford Center is the Route 22 and 17 crossroads where several stores, public buildings and churches are located. The North Branford Center is in the vicinity of where Route 80, 22 and 139 meet.

Four State highway routes traverse North Branford, but there is not direct access to the primary transportation routes of the region, Interstate 91 to the west and Interstate 95 to the south. Of the four, Route 80 is most used because it is an important transportation route paralleling shore routes to the south. Route 80 provides access to the majority of commercial and industrial establishments in Town.

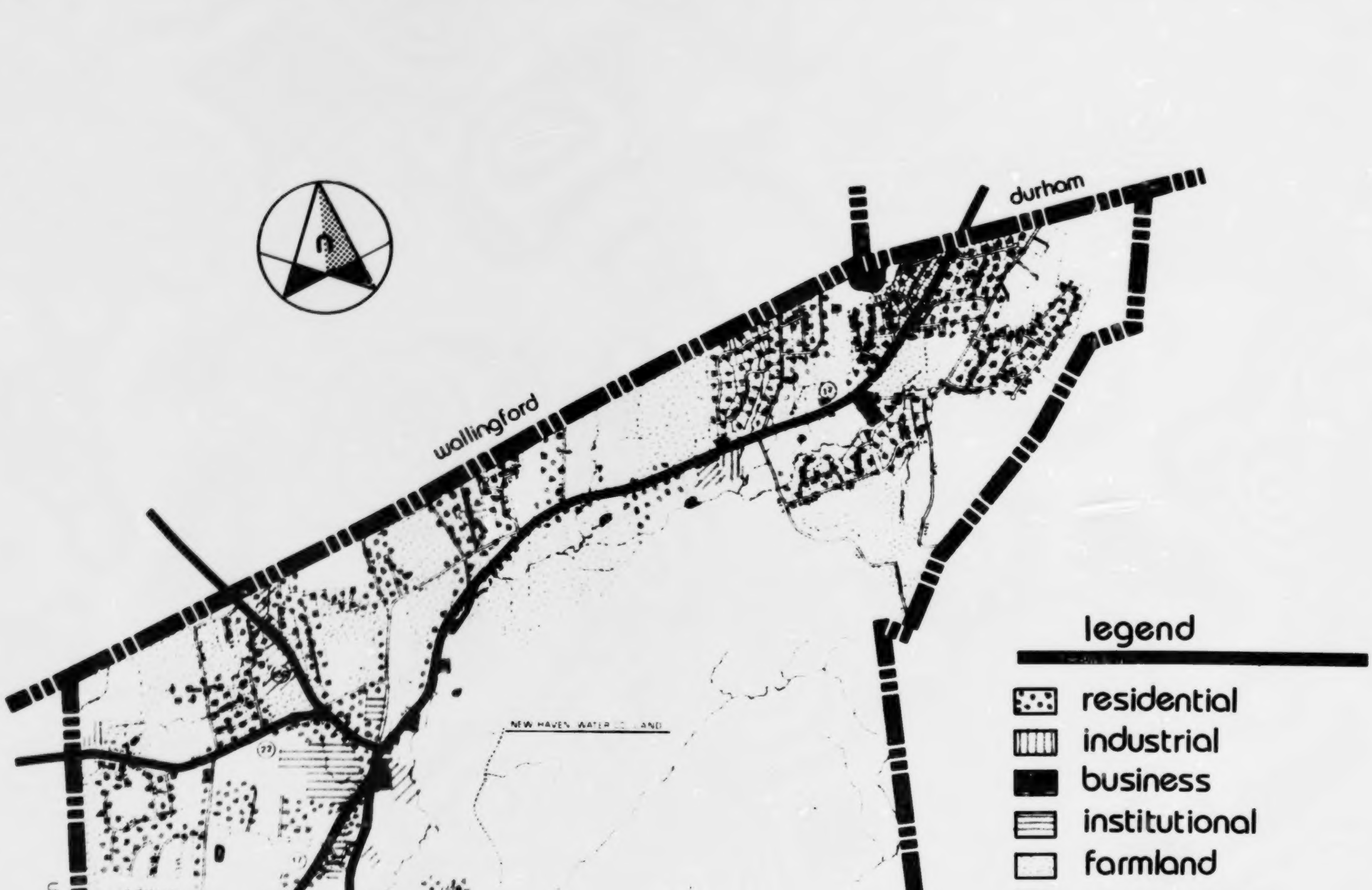
### 4.212 Patterns

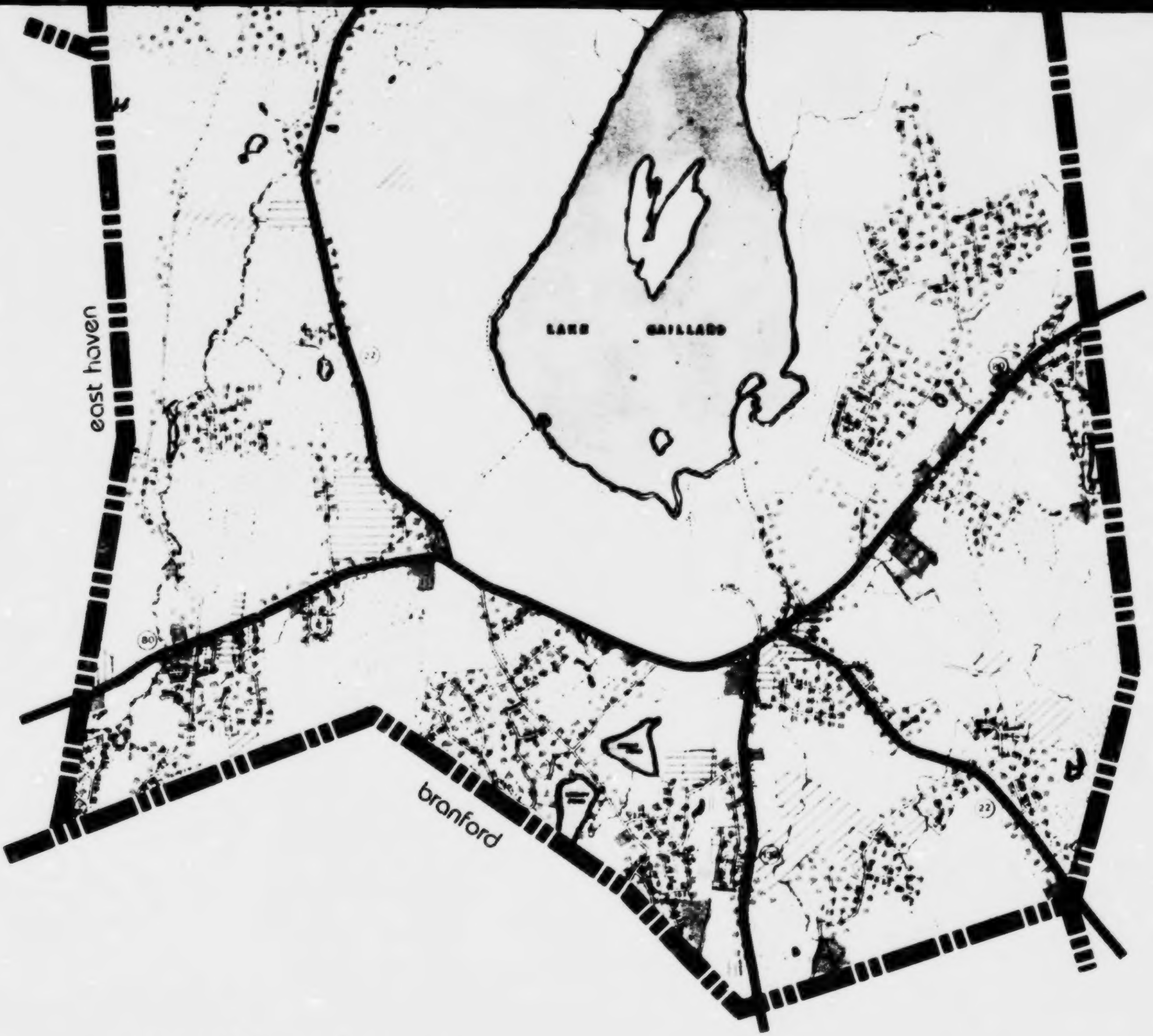
The land use trend of the past 20 years has been one of gradual suburbanization. The general pattern of growth has been development of subdivisions on converted agricultural land, followed by commercial uses and institutional services along main routes (Figure 4-3).

The primary form of residential growth has been the subdivision. Single family homes have been built on 1/4, 1/2, or 1 acre lots. New zoning regulations do not include a small lot category but does include a 2 acre category. Development is concentrated in the northern and southern sections, but several subdivisions have encroached on the open farmlands in the central part of the Farm River Valley. Homes are also located along many of the roads in Town including older structures dating from the 18th and 19th Centuries. A trailer park is located near Route 80 and Totoket Road. A small amount of multi-family housing exists primarily as garden apartments in the Branford and Northford village areas.

Commercial development is not concentrated in a Town center, but exists in strip form at a modest level in each of the two centers of Town. Some are located in Northford especially at the Route 17 and 22 crossroads while the majority has located along Route 80 (Foxon Road) in North Branford. Commercial development has followed, and tends to be dependent upon, residential growth. No major shopping center has been developed; regional shopping facilities are located elsewhere.

Although North Branford is primarily residential in character, some industrial land-uses are present. Among the uses are light manufacturing, trucking, and construction. Locations are scattered around Town but more are in the southern section. A large amount of land in the southern section is zoned for industry, but remains undeveloped. A major extractive operation has long been located on Totoket Mountain. The New Haven Trap Rock Company produces crushed stone for road beds.


n
durham
wallingford
north haven
guilford
NEW HAVEN WATER CO. LAND
22
17
legend
residential
industrial
business
institutional
farmland
open space
vacant land


east haven
LAKE GAILLARD
80
22
22
branford

general land use

figure 4-3

north branford wastewater treatment facilities

date: february 1979

source: anderson-nichols &co.,inc.

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Institutional land uses include Town buildings, schools, churches and cemeteries. Because the Town has two centers, many Town services are provided in both, such as schools and libraries. They are clustered at the Route 17 and 22 crossroads in Northford and at the Route 80 and 139 intersection in North Branford. Town offices are located in the southern section. There are no State or Federal institutions located in the Town.

The extent of active farmland has diminished significantly in the last 20 years due to conversion to other uses. However, hundreds of acres remain in dairy, poultry, vegetable farms and orchard. Farmland is scattered throughout the Town but the largest tracts are in the central section of the Farm River Valley.

Open space in North Branford is both plentiful and scarce. One third of the Town is undeveloped open space owned by the New Haven Water Company. However, it is not accessible for recreational purposes, and, due to obstructing ridge-lines, views of the lake are not possible. Little open space is publicly owned. One relatively large tract of approximately 75 acres was recently purchased by the Town along the Branford River.

### 4.213 EPA Environmental Resource Inventory

During the course of the EIS study, the Region I Office of Environmental and Economic Impact was able to utilize the technical capabilities of the Office of Research and Development, Remote Sensing Operations Branch in a valuable opportunity for collection of land use information in North Branford. In July 1978, during two overflights at 6,500 and 3,500 feet above ground level, color photography of the entire area was required. This information has been reproduced as two sets of color prints at a scale of 1:13,000, showing land use and drainage. An additional set of photos shows the Farm River and possible non-point pollution sources at a scale of 1:7,000.

This information has proven to be a valuable up-to-date complement to local mapping and maps prepared during the course of the EIS project. One example is the use of this resource in the evaluation of impacts on agricultural land. While the Town already has an inventory of farmlands that are participating in the use value assessment program (those mapped on Figure 4-3), and considerable information about specific farm properties in the Fellows study (Section 4.255), the EPA photo inventory provides fresh information on actual utilization of farmland at the moment.

## 4.22 Land Use Regulation

The land use patterns seen in North Branford today (and particularly those which will emerge over the course of the 20 years planning period) are, in part, a result of governmental regulation at different levels. It is particularly important that residents be aware of the rules which may have influenced land development in the past and the mechanisms that are available to help guide local growth in the future.

The administrative and regulatory control of land use has itself been subject to growth in North Branford. Along with rapid growth during the last 20 years, has come professional, full-time administrators involved with planning and more comprehensive zoning regulations have been promulgated. New land regulatory systems such as streambelt protection, wetland protection, and preferential tax assessments for agricultural land, forests, and open space, have emerged. Undeveloped land has been purchased as open space both by the Town and a private land trust. Non-legal restraints that influence land use include the Town plan of development, the comprehensive plan of the regional planning agency, and the State plan of conservation and development.

State controls include: the inland and coastal wetlands program, the stream encroachment program, health codes, solid waste management requirements and water council protection criteria. New regulations pertaining to use of public water supply watershed lands will soon be promulgated by the State Department of Health.

Some of the areas of land use regulations that are of importance to the EIS are highlighted in the following sections.

### 4.221 Water Company Lands

A look at the land use map (Figure 4-3) quickly conveys the importance of these lands to the Town of North Branford. About 1/3 of the total land area of the Town is in New Haven Water Company ownership. The status of the private water company and its lands has been the subject of local press coverage for at least the past year. The major issues of concern to North Branford have been the ownership of the company and the possible sale of its lands.

Over the past year, the City of New Haven has expressed an interest in exercising its option to purchase the company. At the same time, a regional entity representing basically the towns whose lands are owned by the water company has been formed and has been bidding for the purchase of the utility. Local concerns have been expressed regarding the likely impact of ultimate ownership. At this time, the property owned by the New Haven Water Company comprises about 14% of North Branford's grand list for taxation purposes. In addition, the possible disposition of a portion of the water company's lands could raise concerns with respect to the overall orderly development of the community.

State legislation directed the Connecticut Council on Water Company Lands to develop a comprehensive state policy on the disposition of water utility lands. A report was published in 1977 which examines the historic and current status of State regulatory programs and the purpose of further State involvement. Water company lands have only recently become an issue of concern. The level of State involvement in the sale approval process increased as some of the utilities began to advocate extensive land sales. A trend toward higher levels of treatment in addition to increased pressure for multiple use of watershed land induced proposals for sale of some utility lands. In response, both the State and individual towns were granted a purchase option and additional time to establish financing. A moratorium statute on water utility land sales was passed, to be in effect until June 1979, as a maximum, or until adoption of new regulations by the Department of Health as a minimum.

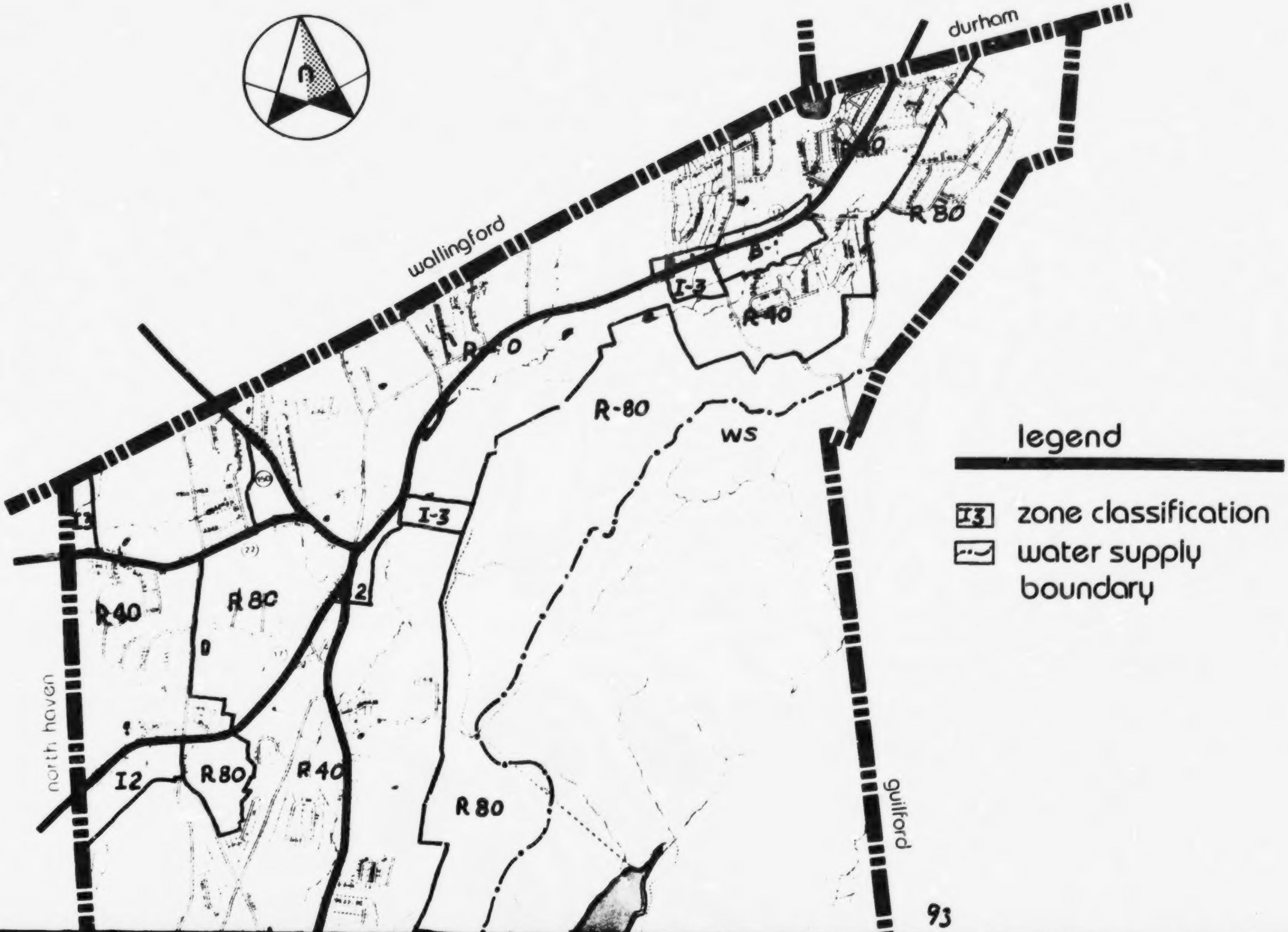
One of the questions raised concerning watershed land management is based on 1977 drinking water standards. If expanded treatment processes are required, the water companies argued that there may be less need for continued land use controls on watershed land. The council report, however, concluded that continued water utility ownership of critical lands was necessary even where complete treatment facilities would be utilized.

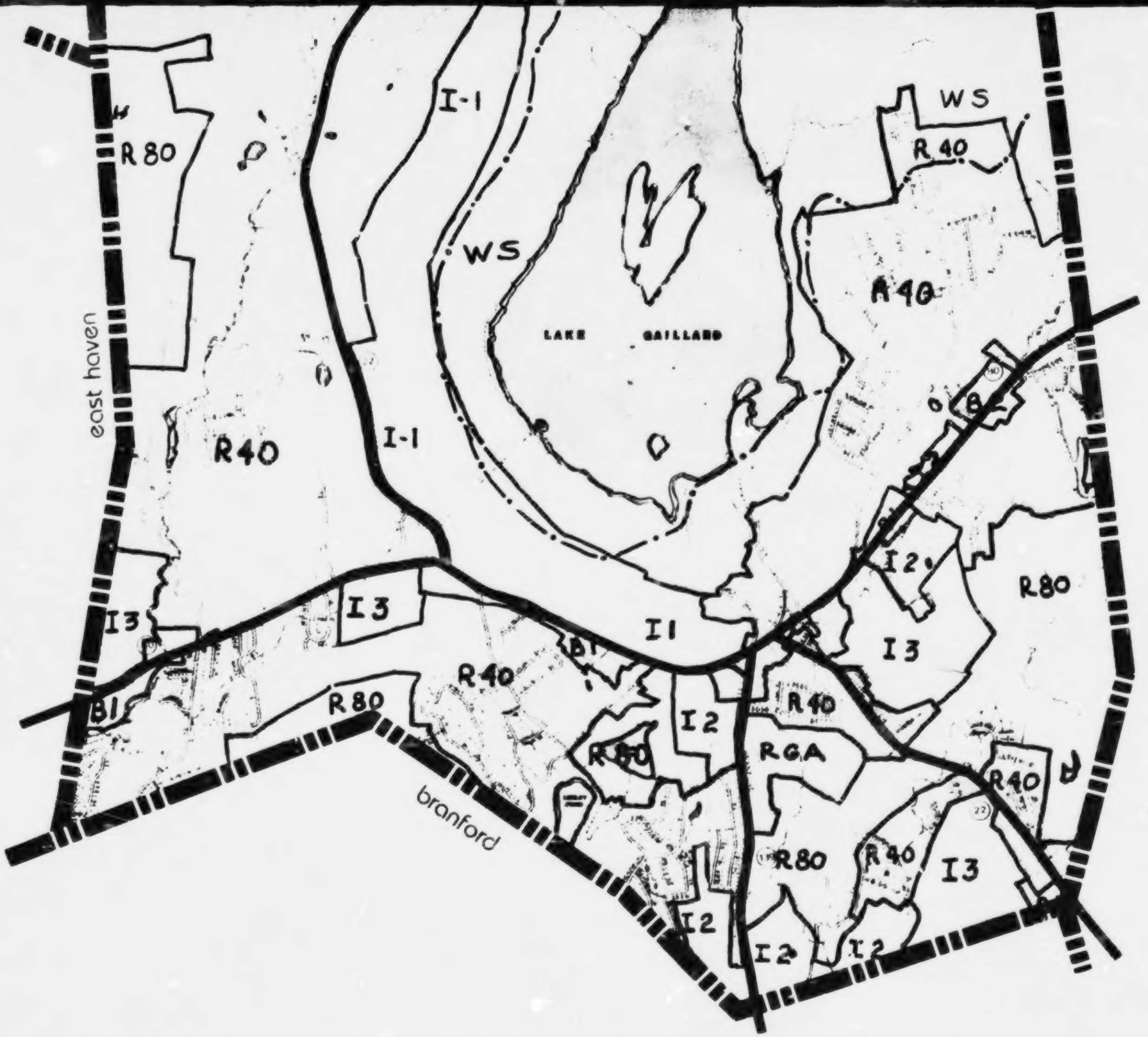
Watershed lands tributary to water supply reservoirs were divided into categories based on physical features and relationship to water quality. Class I lands cannot be sold, and cannot be developed. Class II lands can be developed, but regulations are stringent; the State Health Department will review projects in terms of performance guidelines now being developed. Class III land is located outside of the watershed and can be sold and developed. Most of the land owned by the New Haven Water Company in North Branford is Class II.

Regulations have been drafted for, but are not yet approved by, the Connecticut Department of Health to use in approving the sale of utility company lands. In the EIS study, it was assumed that the water company lands would remain essentially undeveloped.

### 4.222 Zoning

Local government in Connecticut exercises the greatest control over land use through zoning, subdivision regulations, and the permitting of activities in wetlands. Zoning is the primary way that physical development is managed. The five-member North Branford Planning and Zoning Commission and staff reviews applications and grants-required permits. The Zoning Board of Appeal hears and decides Zoning regulations appeals.


n
durham
wallingford
north haven
guilford
R40
R80
B
I-3
R-40
R40
R-80
WS
I-3
I3
(22)
R40
R80
2
I2
R80
R40
R80
legend
I3 zone classification
water supply boundary


WS
R 80
I-1
R 40
WS
R40
LAKE GAILLARD
east haven
R40
I-1
B
I2
R80
I3
I3
I1
B1
I3
B1
R40
R 80
R40
I2
R80
RGA
R40
branford
R80
R40
I3
I2
I2
I2

zoning

figure4-4

## north branford wastewater treatment facilities

date: february 1979

source: planning & zoning commission

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technical consultant

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By the early 1970's, the existing zoning ordinance had become burdensome to apply in the face of growing Town concern with land use decisions. Planning began for a new ordinance in 1972. Final acceptance by the Town was in August 1977. The new regulations include four new special districts which reflect expanded objectives in land-use control. They are a planned residence district, streambelt protection district, water supply district and town design district. The new categories overlap one or more of the underlying districts.

The new regulations include performance standards pertaining to environmental quality, stricter sign control measures and cluster development in one acre zones if the project is greater than twenty-five acres.

The new zoning map, (Figure 4-4) developed concurrently, incorporates soil and slope characteristics into designation of districts. Areas with problem soils or slopes correspond with the new large lot category of two acres. Two examples of change are land west of Totoket Road with steep slopes and land south of West Pond Road with high water table which have been shifted from a one to two acre classification.

A substantial change occurred in the southeast portion of Town where the previous zoning was predominantly one acre residential and it is now allocated primarily an industrial zone and two acre residential. This land is within the A area in which sewer construction has begun. Much of it, however, would not be within the service area of the initial construction. The total acreage zoned industrial is 1,379 acres or 8% of the Town's total acreage.

Business zones along highways have generally been reduced. Business acreage now amounts to 247 acres or 1.4% of the total land.

Residence categories have expanded from three to four, from one, and one and a half, and garden apartments to one and two acre lots, garden apartments and the new special district applicable to projects over 25 acres, which allows cluster development.

### 4.223 Wetland Regulations

In Connecticut, the inland wetlands are defined by the Soil Conservation Service as those soil types that are classified as poorly drained, very poorly drained, floodplain, and alluvial. In North Branford, all rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, and bogs come under the jurisdiction of the Town under Public Act 73-571. Regulations based on a state-prepared model were made effective in North Branford in 1974. The local Inland Wetland Agency issues, or issues with modifications, or denies permits for all regulated activities affecting such land in Town. Regulated activities are those which involve removal or deposition of material, or any obstruction, construction, alteration or pollution of a wetland or watercourse. If the Agency finds that the proposed project involves a significant activity, the applicant may be required to submit specific information, such as a biological review or an analysis of future cost/ benefit differentials of the project. Strong public opinion can influence the agency to decide that an activity is significant. A public hearing is required on all applications involving a significant activity.

The majority of regulated areas in Town are related to streams or ponds (Figure 4-1). In the southeast section, designated areas are Notch Hill Brook, Branford River, Munger Brook, and adjacent parcels of land. Designated wetland surrounds Cedar Pond. In the southwest, land around Burrs Brook and that segment of Farm River are wetlands. Wetlands border the Farm River for its entire length through North Branford and comprise the largest entity in area. Wetlands in the northwest are the small streams and several swamps which drain to the Muddy River in North Haven. On the west side of North Branford there are two large designated wetlands, one is east of Village Road near Foot Hill Road, the other is further south and on the east side of Village Road. They are two of only a few wetlands in Town not in a linear, stream-related form.

Prior to the adoption of local wetland regulation, some development had occurred in North Branford in wetland. In the Arthur Court area in the southwest and in the northwest corner of Town, both north and south of Clintonville Road, development occurred on soils that were basically wetland types. In both these instances, widespread problems with septic systems have developed.

At the Federal level, Executive Order No. 11990 mandates the avoidance of wetlands, unless there is no practicable alternative, for all construction funded by the government. Unlike the State classification which is based solely on soil groups for wetlands identification, the Federal definition relies on vegetation too as an indicator of wetland. Because of the considerable interest that has arisen concerning wetlands, both the regulations governing them and the classification systems that are used to identify them are in a state of revision and development. In the interim, the assessment of the wetland resource and the impacts related to it require site-specific judgements based on the full range of wetland values including flood storage, habitat, and water supply.

### 4.224 Flood Plain Regulation

Flooding in North Branford generally results from rapid accumulation or runoff of surface water due to hurricanes, high intensity storms such as thunderstorms, and rainfall occurring over larger areas.

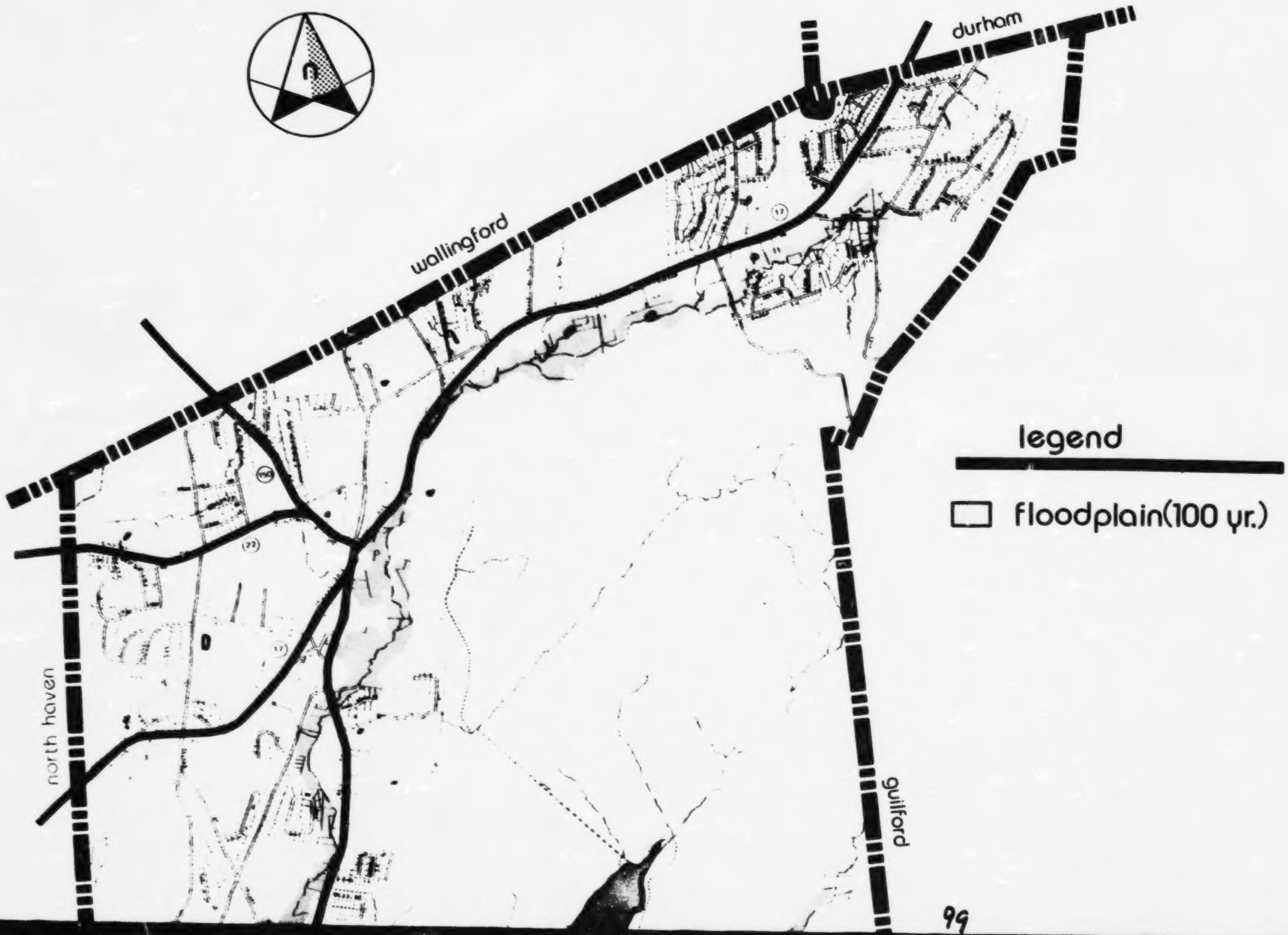
Some development has taken place within floodplain areas. Farm related uses or forest occupy most floodplains. Reasons for controlling land uses on floodplains include: reduction of flood hazards and losses, protection of water quality and other hydrologic functions, soil conservation and preservation of fish and wildlife habitat.

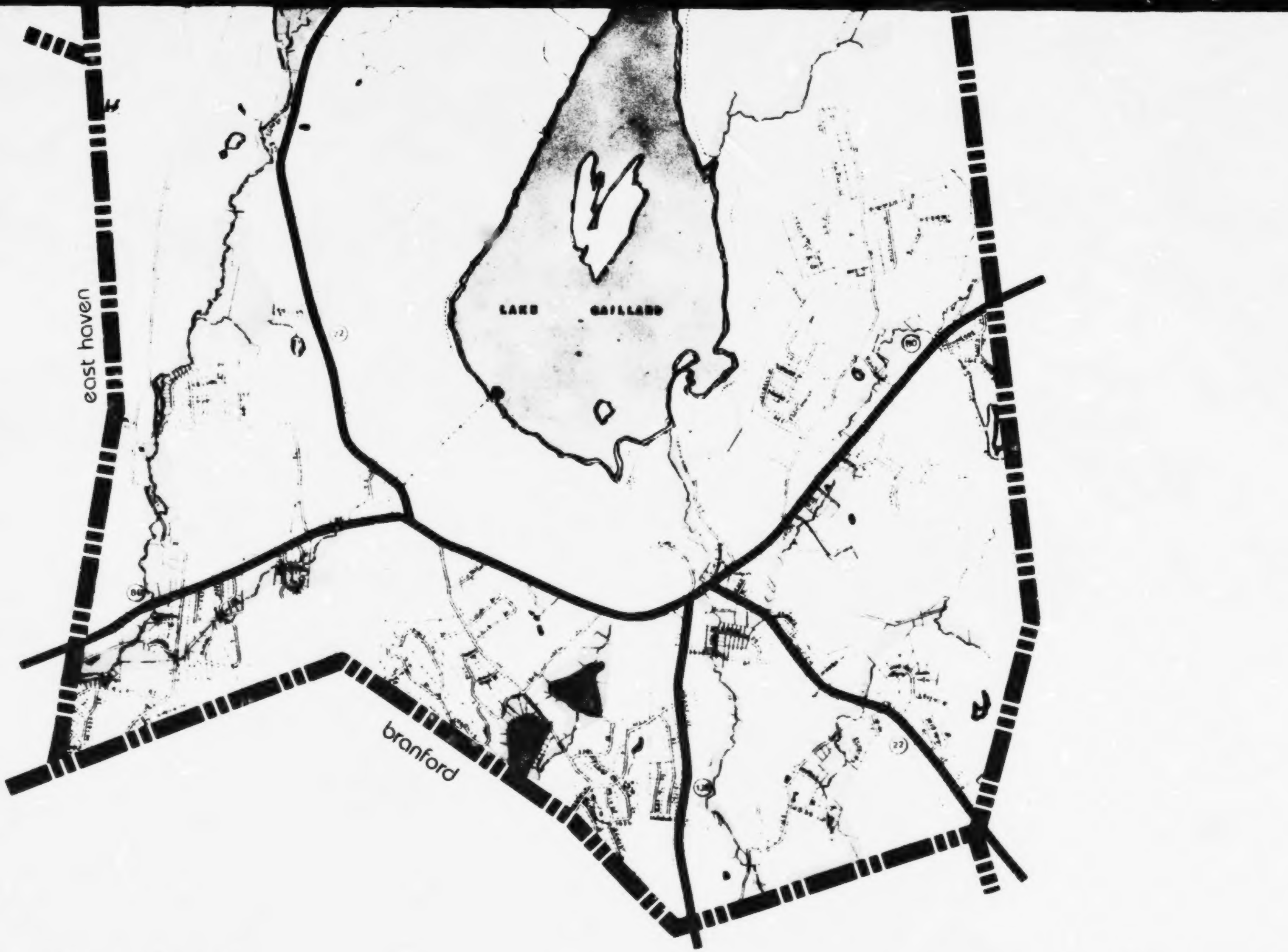
The Farm River creates a flooding problem in North Branford and East Haven. "The Conservation Plan for North Branford", prepared in 1970, gives top priority to formation of an open space corridor along the Farm River to protect and develop its natural resources. "The North Branford Plan of Development", prepared in 1971, also recommends a general open space system the length of the Farm River. The Soil Conservation Service has completed preliminary plans for a dam to control flood waters. A 30 foot earthen dam is proposed, 3,000 feet long running east-west near Jerz Lane and is designed to flood 140 acres from Page Mill Pond to Totoket Park.

During the past year, discussions of this proposal have centered around the question of whether the dam should be built to retain a permanent pool, which would have multiple use potentials for recreation, or leave the area dry for emergency storage only. At this time, the outcome of the project is still uncertain.

The former zoning regulations contained a streambelt protection district as an overlay district. It was an interim ordinance written into the regulations in anticipation of North Branford's compliance with the HUD flood insurance program. The National Flood Insurance Act provides government sponsored flood insurance for buildings in flood prone areas when communities are in compliance with HUD requirements. Flood insurance rate maps show the boundaries and elevations of the 100 year and 500 year flood plains (Figure 4-5). The flood insurance study has been completed and was adopted into the Zoning By-Law late in 1978.

Executive Order 11988 mandates that no federally financed activities can be constructed in a floodplain unless no practicable alternative exists. Interest in the floodplain arises from concerns over damage to existing property, changes in the natural flood regime that may increase flood risks, and assurances that future development will not be encouraged in these areas.


n
durham
wallingford
north haven
guilford
legend
floodplain(100 yr.)


east haven
branford
LAKE GAILLARD
22
80
22

## floodplain

figure4–5

north branford wastewater treatment facilities

date: february 1979

source: dept. of housing & urban development

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### 4.225 Agricultural Preservation

Traditionally, North Branford has been a rural agricultural area with many dairy, poultry, and vegetable farms. The number of farms decreased significantly in the last 20 years. By the early sixties, conversion of farmland was a noticeable trend.

North Branford was the subject of a research project conducted by Dr. Irving Fellows of the University of Connecticut, entitled "Rural Land Use Policy in an Urbanizing Society". As a research subject, the Town served as a typical suburbanizing community in the study of the social and economic feasibility of an easement purchase program.

Farmland, as shown in Figure 4-3, was derived from maps developed for the Fellows project. On this map, farmland includes all farms and forestland utilizing the preferential tax assessment program in North Branford in 1974. The research project further differentiates between viable and non-viable farmland based on soil and size criteria. Not all of the farmland in Figure 4-3 is considered "viable" for the purposes of the research study.

Active farmland is in every part of North Branford, but tends to be concentrated in the Farm River Valley. Most operations are between 50 and 130 acres and include forested portions. While farming is no longer the dominant activity in North Branford, the farm economy is still significant. In addition, open farmland provides indirect environmental benefits of open space and rural character.

Policies and legislation exist at the Federal, State and local level for the purpose of protection and maintenance of agricultural land resources. At the Federal level, a policy was established within the National Environmental Policy Act aimed at preserving and maintaining wherever possible important historical, cultural, and natural features including highly productive or unique farmlands. Prime farmlands can generally be considered those on Class I soils. There are no unique farmlands, that is, those with particular qualities for specialty crops in North Branford.

At the State level, Connecticut tax law, Public Act 490, provides for the preservation of farm, forest, and open space land through use value assessment. Known as the Open Space Act, it is enabling legislation; actual implementation and record keeping has been delegated to the local government.

Preferential assessment began in 1969 in North Branford. The local assessor determines if specific qualifications have been met to obtain use value assessment. In addition to farmland, forest land and open space are eligible. Forest land must consist of 25 acres or more and be certified by a State Forester. There are ten of these parcels in North Branford. An open space designation application goes before the Planning and Zoning Board. There are currently fifteen such parcels throughout the Town.

P.A. 490, promulgated in 1963, has not assured non-development of farmland in Connecticut. It has been a stop-gap action in the land development process. In North Branford where almost all eligible landowners are under P.A. 490, the pace of land being sold for development has not been slowed. Nor has the conveyance tax (P.A. 152) associated with preferential assessment proved to be a constraint.

In 1978, the State legislature passed P.A. 5051, an Act for the Preservation of Connecticut Agricultural Lands, which provides for purchase of development rights. Purchase of development rights, in most states with similar programs, is the responsibility of local government which also retains the development rights. In Connecticut, as a pilot program at first, funding will be 5 million dollars for 2 years. The state will pay 100% of the cost and retain title to the development rights.

"The Connecticut Proposed Conservation and Development Policies Plan", Revision of 1979, includes 10 broad areas of concern, one of which is food production. Under this category, a major policy is "to avoid actions which directly or indirectly support the conversion of key agricultural lands to urban uses". Provision of public sewer service is cited as an example of such an action.

## 4.3 Growth and Development

An important component in the whole decision making process for wastewater management projects is the element of the future. Because most projects involve the use of government grants which are assumed to be only available for the short term, and also because wise municipal investment dictates long term considerations, many parties in the process are required to develop visions of the future. In this section, the "best guesses" of a number of different levels of government will be discussed.

### 4.31 Population Projections

According to the 1970 Census, the population of North Branford was 10,778. The current 1978 population is estimated by the Connecticut Department of Health at 11,600. Previous population data is shown below in Table 4-1.

TABLE 4-1

Past Population Data for North Branford

| | |
|---|---|
| 1930 | 1,329 |
| 1940 | 1,438 |
| 1950 | 2,017 |
| 1960 | 6,771 |
| 1970 | 10,778 |

Source: South Central Connecticut Regional Planning Agency

Much of the Town's growth occurred in the 50's and 60's in a typical post-war suburban development scenario. It is also evident from the most recent figure that the rate of growth has also typically slowed down. The current projections for future population growth show a fundamental change in the rate of future growth that is anticipated. The basis for this slowdown is, in part, a reflection of the State and national trend toward smaller families. In addition, the regional planning agency believes that the thrust of new development will be along the Route 91 corridor away from North Branford.

The early sewer studies for the Town were conceived during the earlier period of rapid growth. At the time the population estimate that was assumed was 30,000 by the year 2020. Any development of future growth scenarios must take the more recent growth assumptions into consideration. Within the planning period now specified by EPA, for grant purposes 20 years, the population is expected to increase by 2,600 people.

TABLE 4-2

Population Projections for North Branford and Neighboring Communities

| | 1980 | 1990 | 2000 |
|---|---|---|---|
| New Haven | 129,750 | 129,100 | 130,450 |
| East Haven | 25,225 | 21,300 | 27,340 |
| North Haven | 23,350 | 24,475 | 25,150 |
| Wallingford | 38,100 | 41,000 | 43,400 |
| Branford | 22,100 | 23,700 | 25,325 |
| North Branford | 12,650 | 14,000 | 15,250 |
| Guilford | 15,960 | 18,700 | 20,400 |

Source: South Central Connecticut Regional Planning Agency

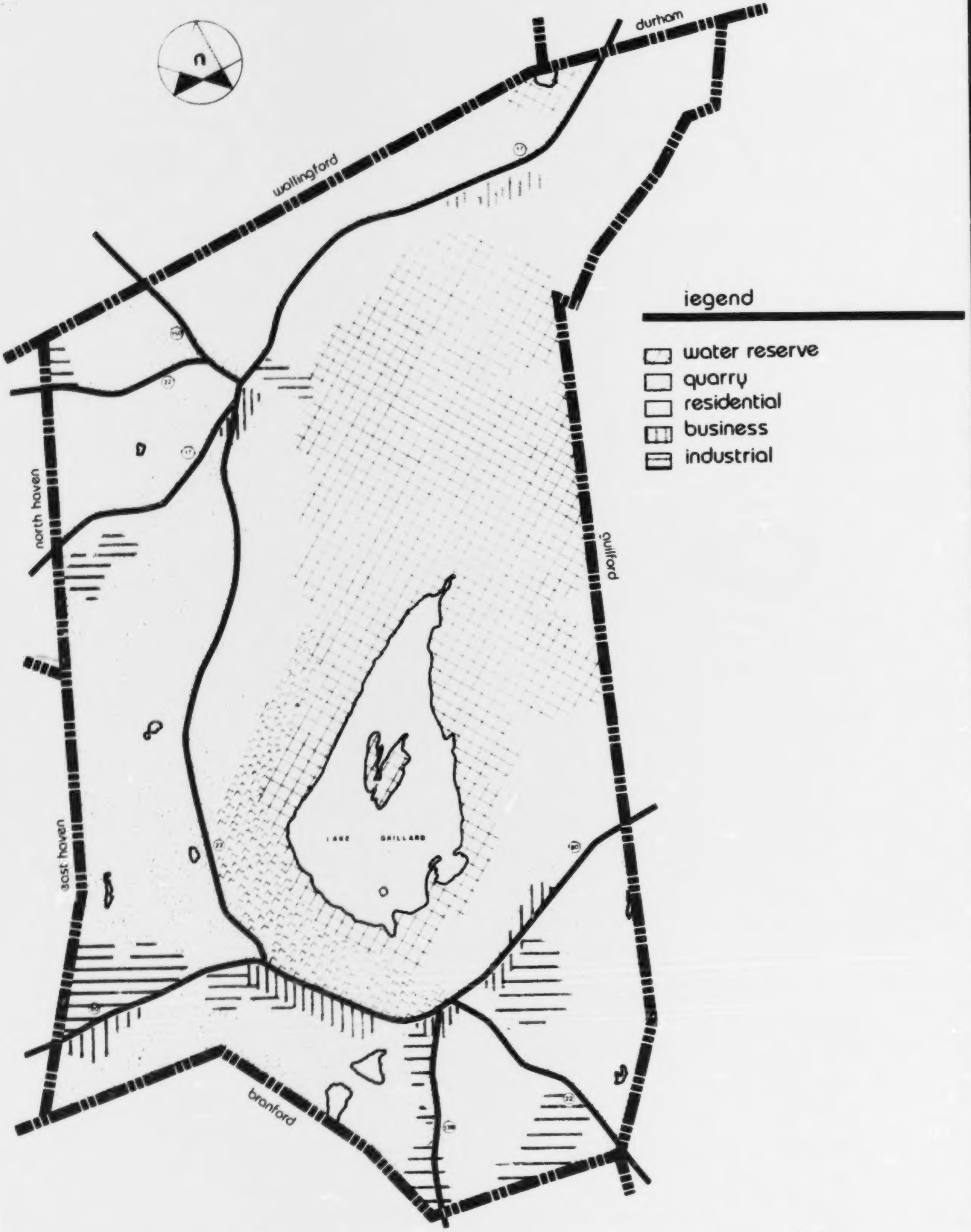
## 4.32 Local Plan of Development

The North Branford Planning and Zoning Commission had a local plan prepared in 1971 with funds from the Connecticut Department of Community Affairs. The plan outlined the future growth that the community anticipated and the steps which it should take to guide that growth.

The cornerstone of the plan was an anticipated population of 25,000 by the year 2000. The plan sought to reconcile this growth with other community objectives such as preservation of rural character and open space. Throughout the plan, sewers and public water supply were seen as necessary for the development of industry and the provision of variety in housing stock (20% of the housing stock needed was identified as multi-family).

Major items of interest include:

- New Haven Company lands will be retained for water supply purposes.
- Central water system should be extended to all built up areas with density of one family or more per acre and industrial and commercial land.
- Sewers should be available to areas having 5 or more persons per acre including residential areas having 2 or more families per acre.
- A central sanitary sewer system is essential to compete for new commercial and industrial development.
- New residences in now vacant areas should be at a density of not more than one family per acre due to lack of central water and sewer systems.
- New zoning should be based on slope and soil conditions. Where there is water and sewer access, provision should be made for 1/2 acre zoning, garden apartments and town houses.


n
durham
wallingford
north haven
east haven
branford
guilford
lake gaillard
17
150
22
80
legend
water reserve
quarry
residential
business
industrial

local land use plan

figure 4-6

north branford wastewater treatment facilities

date: february 1979

source: planning & zoning commission

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anderson-nichols & co., inc. technical consultant

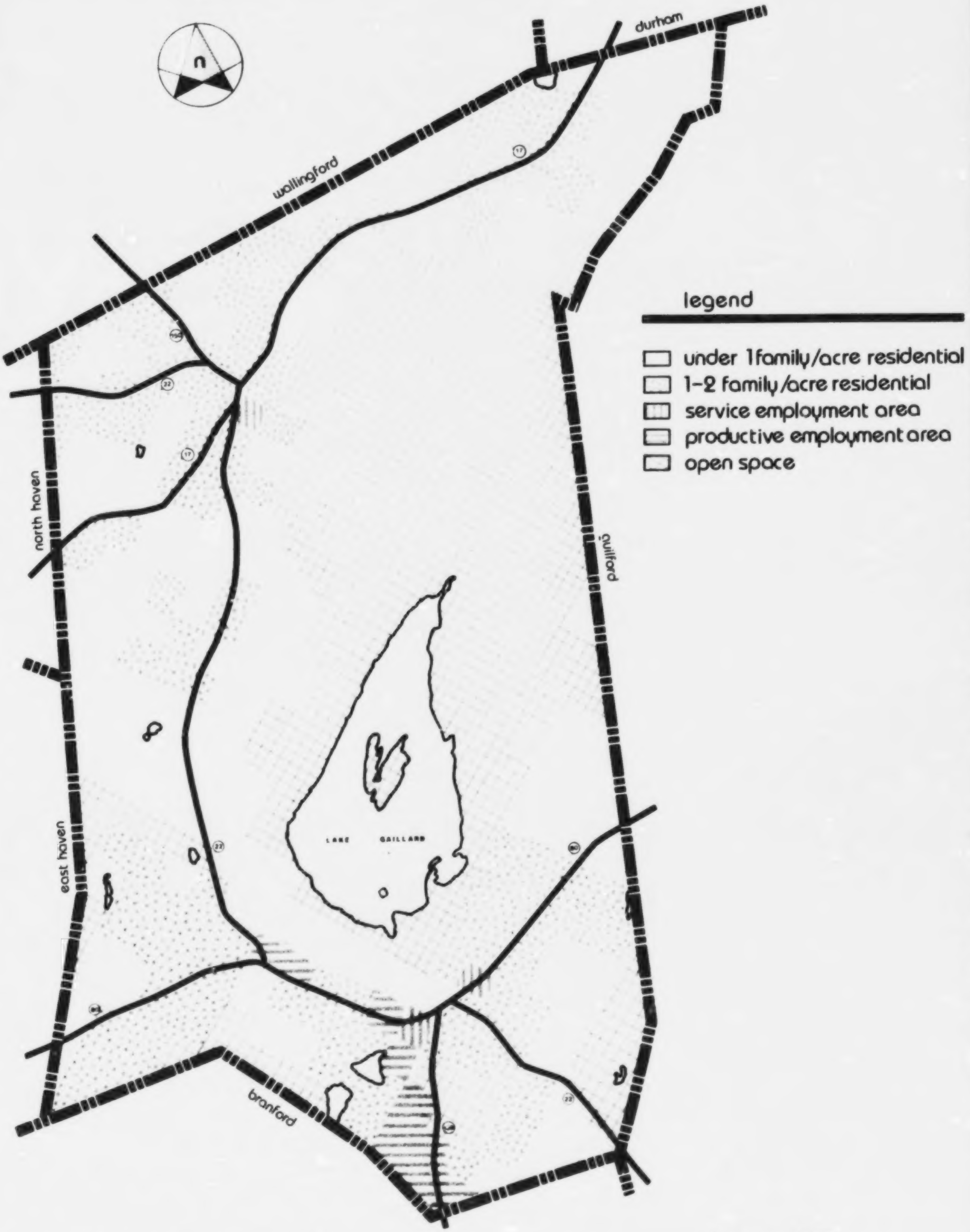
The main factor that should be kept in mind when consulting the plan is the atmosphere in which it was developed. Drafted at a time when rapid development was occurring, the plan assumed the trend would continue. The slow-down that occurred shortly thereafter, and continues in effect has now been widely accepted as the trend for the foreseeable future. The development pattern which the plan supports is shown on Figure 4-6.

Since the development of the plan, the zoning has been revised and the one acre lot is the minimum. Also sewer service is now available in the southern section (Area A) where most industrial land is found. Also sewer construction is pending in the area north of Clintonville Road. In this light, attention is called to the seeming conflicts that exist between the Town's general plan and the theory behind the Town's Concept for sewering. Where development is occurring on one and two acre lots, future sewering is highly unlikely.

With a better grasp of the Federal and State participation in this project, over the planning period (20 years), the Town should move towards refining its plan. Specifically, it could now address the concepts of concentration in core areas, and preservation of the rural environment in others. Maintenance of open lands and farmlands in the Farm River Valley would complement those objectives.

### 4.33 Regional Plan

In this planning sphere too, the dramatic changes in development trends of the past few years are only now being reflected in the published planning documents. The South Central Regional Planning Agency prepared a Regional Plan released in February 1978. Changed conditions since the preceding report of 1968 include construction of Interstate Highway 91 to Hartford and a slowing down of the growth rate. A map, "Proposed Land-Use Plan-2000", published in 1968 is retained in the 1978 Regional Plan (Figure 4-7).


n
durham
wallingford
17
22
17
north haven
east haven
guilford
lake gaillard
22
80
22
branford
legend
under 1family/acre residential
1-2 family/acre residential
service employment area
productive employment area
open space

regional land use plan

figure 4-7

north branford wastewater treatment facilities

date: february 1979

source: south central regional planning agency

0 1600 3200

environmental impact statement environmental protection agency

anderson-nichols & co., inc.

technical consultant

The Quinnipiac Valley corridor continues to absorb the manufacturing and commercial expansion of the region as it has since the 1950's. Earlier, the railroad and currently the Interstate Highway have reinforced this development pattern. Residential development has been in surrounding upland towns as well as in the corridor. The Regional Plan refers to this pattern of development as "inescapable". The plan states that over 80% of the projected population in the year 2000 will live in the corridor, and it will be the location of 90% of all manufacturing and service businesses. Estimated regional population for the year 2000 in the 1978 plan is down to 580,000 from over 800,000 in the 1968 plan.

North Branford was characterized as having limited development potential in the past because of poor soil conditions, steep slopes, and rock outcrops. The Plan projects that towns outside the Quinnipiac Valley, such as North Branford, will continue to develop, but at low densities. Several reasons are cited for this assumption:

-- local zoning regulations showed preference for low density,

-- the economic infeasibility of installing public sewers,

-- high initial cost of providing a public water supply.

Because of the existing development pattern, the Plan recommended that towns such as North Branford rezone for other uses some of the land currently zoned for commercial and industrial purposes. Several factors are cited including; a lack of public utilities and means of treating industrial wastes, a lack of water supply, and transportation disadvantages. If North Branford does rezone sections from industrial to residential use, there is potential for residential growth near areas where sewers are now proposed.

Two goals of the plan, pertaining to land use, specifically mention sewers. General cooperation is solicited in development of water and sewer systems because of repercussions on future distribution of land-use and population in the region. The goal is to strengthen existing centers and avoid fragmentation of public services. The other related goal is the coordination of regional services including solid waste disposal and operation of wastewater facilities.

The Proposed Land-Use Plan-2000 reflects this thinking by showing concentration of development in areas where development now exists. Like the Town's plan, however, it does not show anything but low density residential land use in the Middle Farm River Valley. It does not therefore take any positive step in recommending local preservation policy. It does, on the other hand, show areas of less than one acre development in the southern part of the valley. While this is as much a reflection of existing development as anything else, it may also accommodate a filling-in by similar types of developments.

A comparison of the regional and the local plan shows that they are largely in agreement as to general land use. Some differences that are noticeable are evidence of slightly different objectives for the two different levels of planning. The local plan and local zoning show more industrial and commercial development than the regional plan. Allowing for differences in graphic scales and planning precision, the local plan still shows greater levels of development in the southern portions of Town in both Areas A and B.

### 4.34 State Plan of Conservation and Development

A Conservation and Development Policies Plan, prepared by the Office of Policy & Management, will be presented to the General Assembly in February 1979. It differs from the Conservation and Development Plan of 1974 in that emphasis has shifted from setting forth land and water resource policies and recommendations to an expanded field of issues including transportation, energy and air quality.

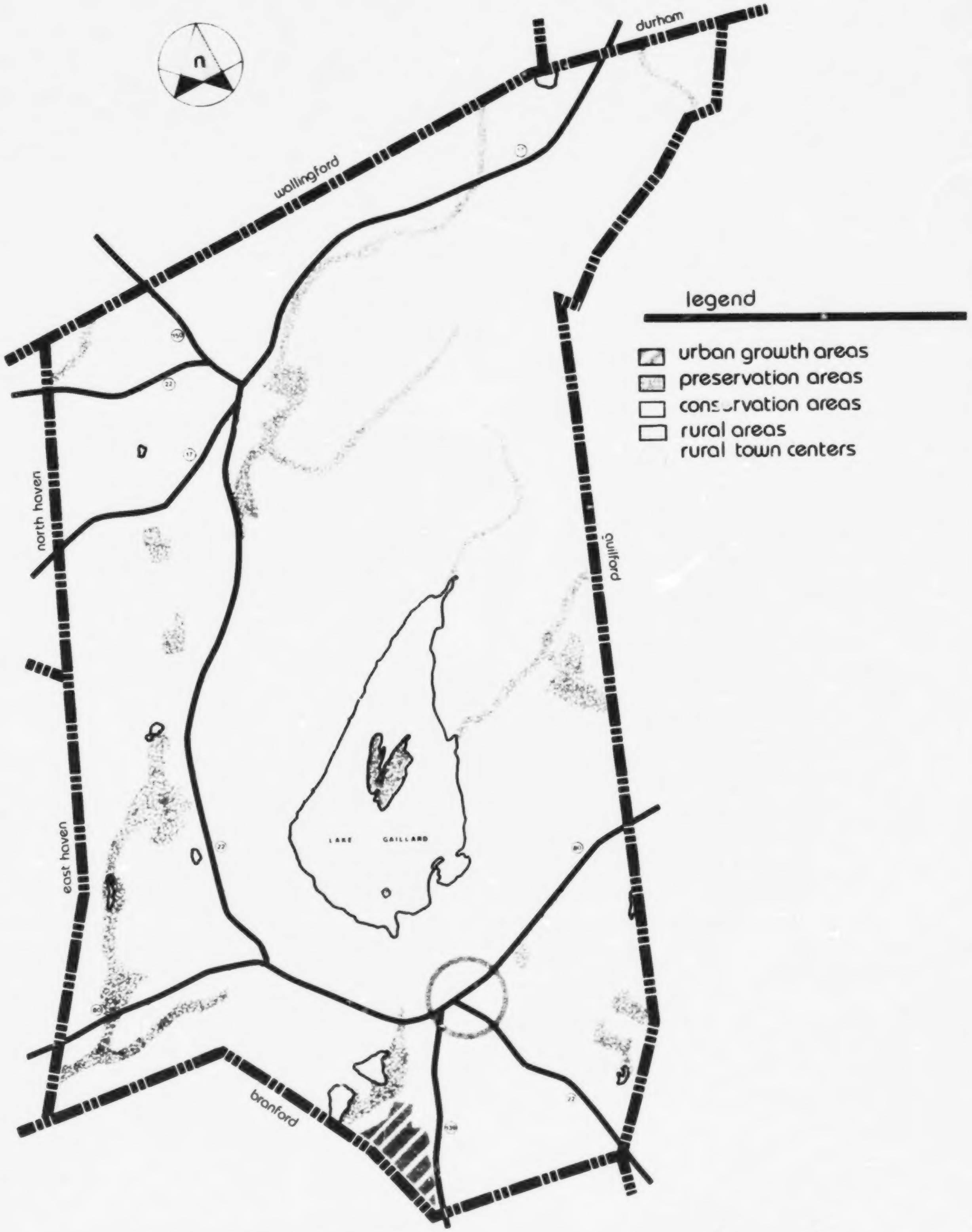
The principle purpose of the new plan is to increase the effectiveness of State capital investment wherever Federal-State pass-through money or State funds are involved.

The Plan is organized around 10 broad areas of concern and their relationship to development and conservation. Among the issues impacting the 1979 Plan are the dramatic decline in recent population growth, the continuing shift of manufacturing and office employment from cities to suburbs, and the rise in the incidence of health concerns, particularly from chemical pollution, and the recent establishment of more stringent Federal standards applying to drinking water.

An important theme of the Plan is to concentrate development and encourage growth where existing infrastructure can be utilized. Within this context, the rural Farm River Valley is portrayed with no projected urban development. The State's policy with regard to sewering in watershed areas has not essentially changed in the Revised Plan. Consideration of alternative ways to abate pollution in such areas as the Farm River Valley is encouraged, but the use of sewers is not ruled out in order to solve an existing problem. Capacity for increased growth is discouraged.

Several differences between the State's Plan and the local planning expressions can be found. (Figure 4-8) Basically, the local plan and zoning show greater levels of development in certain areas. Specifically, the southern part of Area A has much more potential for industrial development under local plans. Also, existing and future development along the Middle Town Road in the northwest are not indicated in the State Plan. Existing and potential industrial development along Foxon Road is also not indicated in the State Plan.

The area that is of most concern for the study is the Farm River Valley. On the Land Area Classification Map that accompanies the report, this land is referred to as Conservation Areas. The explanation of this category is that these are areas where State strategies and priorities should avoid encouragement or support of structural development


n
durham
wallingford
north haven
east haven
guilford
branford
LAKE GAILLARD
legend
▨ urban growth areas
▨ preservation areas
☐ conservation areas
☐ rural areas
rural town centers

state land use area classification

figure 4-8

north branford wastewater treatment facilities

date: february 1979

source: conn. dept of planning & energy policy

environmental impact statement environmental protection agency

anderson-nichols & co., inc. technical consultant

which cannot insure that site planning and design and secondary effects are compatible with the identified conservation values of the site environs. This classification is presumably based on the use of these lands as watersheds. As such, the Plan would seek to avoid sewer systems which encourage increased development and the threat of non-point pollutants.

In the case of the Foxon Area, however, it has been concluded that a limited sewer system is the only cost-effective and environmentally sound solution to the wastewater disposal problems that are found with existing development. This approach was described in the Modified Foxon System.

It was concluded that the Town's Proposal & Concept would also encourage development within the Middle Farm River Valley. This development would introduce the risk of long term water quality degradation basically due to the decentralized control and diminished landowner consciousness that would accompany the development of these lands. While it was pointed out that the existing agricultural development is no assurance of clean water, it can be more easily managed in terms of water pollution than residential development. The No Action alternative would share similar uncertainty as to its impacts on water quality as would the area-wide sewer proposals.

## 4.35 Local Perceptions of Growth

In the course of the EIS project, two perspectives on the future of North Branford emerged. One viewpoint saw a trend of continuing growth as almost inevitable. This group also supported industrial and commercial development as a means to offset expected rises in taxes. The sewer program was seen as a tool to implement this development, as much as to eliminate pollution. This group is probably responding to the growth scenario which they themselves took part in during North Branford's period of growth over the past two decades. Since they have witnessed changes - new homes, new schools, higher taxes - they fully expect more and hope to make the best of the situation.

The other seemingly opposite view characterizes North Branford as a small town and cites rural amenities as one of the main reasons for living there. These people tend to see the sewer program as too large an undertaking. While not specifically addressing the issue of growth, their preference clearly lies in maintaining the status quo.

The thinking of the professional planners reflected in the recent State and regional plans lies somewhere between these popular local views. While the growth mechanisms of the fifties and sixties has definitely slowed down, some continued growth is to be expected. The challenge is also clear. If the values of small town living are to be retained, that growth must be shaped. The two groups can best meet their objectives by planning for reasonable growth.

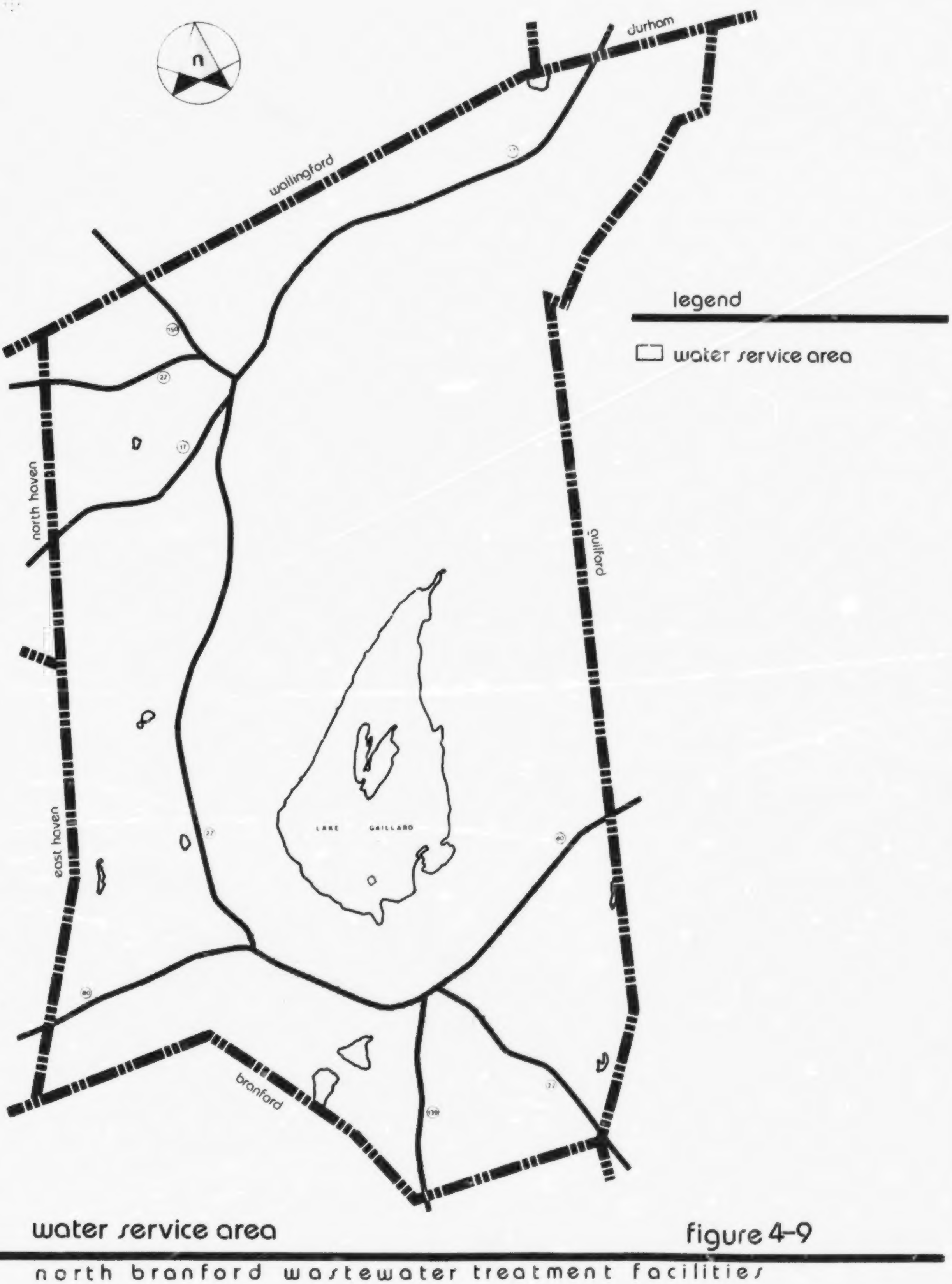
## 4.4 Characteristics of Resource Use

The areas of resource use of most concern in North Branford are water supply and wastewater disposal.

### 4.41 Water Supply

### 4.411 General

North Branford residents obtain their water from three sources: a central water supply system (New Haven Water Company), group wells (2 or more homes from a single source), or individual wells. Areas served by the central water system consist primarily of established development in the southern part of the Town and limited service in the northwest (Figure 4-9). Under the new definition of group system (above) about 50 such systems have been inventoried by the East Shore Health District. Many of these only serve two families. Larger community systems are found in the White Hollow area. Elsewhere dependence is upon individual wells.


n
durham
wallingford
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north haven
guilford
east haven
22
LAKE GAILLARD
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branford
22
139
legend
water service area

water service area

figure 4-9

north branford wastewater treatment facilities

date: february 1979

source: new haven water co.

0 1600 3200

environmental impact statement environmental protection agency

anderson-nichols & co., inc. technical consultant

Concern for water supply in North Branford has several distinct dimensions. Where reliance is on both on-site water supply and wastewater disposal, proper septic system operation must be maintained. This aspect of water supply receives attention through the permit process at the time of building - both a well and septic system permit must be obtained prior to occupancy through the East Shore Health District.

4.412 New Haven Water Company

The New Haven Water Company system is a more complex problem. As noted elsewhere, the very issue of ownership is currently in question with the now private ownership possibly converting to public ownership either under the City of New Haven or a regional authority. The water company land disposition issue is a statewide issue of particular local significance because of the large holdings of the utility within North Branford. Also, the land disposition issue has been tied to the new drinking water treatment requirements of Federal law. Finally, the question of land use on privately owned land and its relationship to water quality has arisen in the course of the North Branford sewer project because the use of State funds may stimulate land development within the watershed.

Two portions of the New Haven Water Company system are of interest here. Within North Branford, the Lake Gaillard Reservoir receives its water both from surface runoff from protected water company lands within its watershed and from three diversions of surface streams. Water is diverted from the Menvekatuck Reservoir to the west via an aquaduct and tunnel system. Water is also diverted from Gulf Brook in the Northford Village section of North Branford southeast through a tunnel to the reservoir. This intake is located east of Tommy's Path on water company land and receives its flow from the undeveloped Gulf Brook watershed to the northeast which is also owned and protected by the water company. The third diversion to Lake Gaillard is of particular interest because it receives flow largely from private lands. The Northford diversion is located on the Farm River about one half mile downstream of Reeds Gap Road in the northeast corner of Town. The land upstream of this intake comprises approximately 20% of the reservoir's source and is substantially developed, including within it, the White Hollow problem area.

The Lake Gaillard reservoir is regarded as an exceptionally good source of high quality water. It's safe yield of approximately 28 mgd is about 45% of the total safe yield of the water company's supplies. The only treatment presently required is chlorination prior to delivery into the system through either gravity flow or a pumping option.

The Farm River watershed within North Branford also supplies the Lake Saltonstall Reservoir through a diversion. This intake is located in East Haven, about one half mile west of the North Branford Town Line. It's potential importance to this portion of the system is reflected in the fact that the Farm River watershed comprises about 70% of the whole watershed of this reservoir. All the water is not diverted, however, at this time. A filtration plant, constructed within the last few years, provides treatment to the water prior to chlorination and delivery to the distribution system.

The operation of the water system is a product of experience and judgement more than one of standard procedures. The quantities that are diverted, for example, are not exactly known nor is their regulation a function of a prescribed management system. Record keeping at the Saltonstall intake consists of recording the number of revolutions that a hand-turned valve is open and closed during a certain time period. While the flexibility exists to allow potentially polluted flood peaks to be by-passed, no specific policy of monitoring determines this practice. In addition, decisions are made on routing of either Saltonstall or Gaillard water to the distribution system on the basis of the economics of providing more costly treated Saltonstall water versus the more naturally occurring Gaillard water. The options of gravity or pumped flow from Gaillard adds an additional dimension to the water system's complexity.

Because of the multi-variable nature of the system, no further quantification of its use of Farm River flows was attempted. When the physical unknowns are combined with the water quality variables, that are noted in the following sub-sections, any meaningful quantification becomes impractical.

### 4.413 Water Quality

Available water quality data indicates that the waters of both reservoirs are generally free of any evidence of bacterial contamination prior to receiving any treatment. This is in contrast to the often high measurements that have been recorded in the Farm River that partially supplies both reservoirs. Factors that could account for this difference include attrition due to distance from source, competition with other organisms, and dilution by uncontaminated water. As mentioned elsewhere in this report, the other measures of gross human pollution are not high enough even in the streams to be of any immediate concern. These findings do not, however, entirely eliminate concern over the impacts of development on water supply. The possibility exists that other more subtle effects, such as metals or pesticides may be present but unreflected by the scope of past monitoring requirements. Further insight into this issue will be provided this year when the more stringent requirements of the Federal drinking water standards go into effect.

In the past, overall purity of the water supply has been maintained by the single technique of minimizing man's activities in water supply watersheds. In the northeast United States in particular, this has given rise to the single purpose water company land holdings from which the public has been prohibited. The threat to water supply was seen primarily in direct contamination by human feces which historically had been responsible for the transmission of numerous diseases. More recently, especially in the west, the trend had been toward multiple use of reservoirs and watershed lands acknowledging, perhaps, that both natural buffering conditions and management practices such as disinfection were sufficient to safeguard the public.

Most recently, attention has come to be focused on trace materials, such as metals and synthetic organics which have increased slowly but persistently for long periods of time and require more treatment for their removal. Because their presence has most commonly been identified with more intensive urban development, the trend toward maintaining low levels of development has been reinforced. At the same time, the increased concern of regulatory agencies for achieving high quality finished water by higher treatment requirements has led the water companies to argue that greater treatment should permit some relaxation of their land management practices. The net result of this in Connecticut has been the watershed classification program which will permit the sale of some lands by the water companies. At the same time, the State Land Policy Plan has discouraged State actions which will encourage development of watershed lands and seeks to have this policy extended to watersheds, such as the Farm River, that are privately owned.

The issue of minimizing possible pollution by restricting development is not straight forward however. While conversion of land from forest cover to residential use will increase all pollutant loadings, the presence of extensive agricultural lands in the Farm River Valley complicates this issue. On an acre-by-acre basis, farmland loadings can exceed residential loadings in the categories of bacteria, oxygen demand, and nutrients by a factor of 10 (animal feedlots contribute significantly more). Also, the risk of chemical contamination from agricultural use of pesticides and herbicides is a significant potential source of pollution. In some instances, the conversion of farmland to residential use could actually result in a decrease in the pollutant load. Not all residential development is the same either; planned development of mixed housing stock can reduce pollutants by as much as 50% from that of typical suburban development through reducing impervious surfaces which significantly contribute to the pollution load per acre.

Too many other variable factors, such as the fate of these pollutants in soil and vegetation are present to accurately estimate the overall pollutant levels that may occur from a combination of possible land use scenarios. Mismanagement of either agricultural or suburban land use through indiscriminate waste disposal or increasing runoff can increase the pollution potential. Even suburban subdivision increases the possibility of pollution through the de-centralizing of decision making and management of the land. While maintenance of the status quo may appear to be the cautious conservative route appropriate to the long term protection of public health, the forces that control the current development process are largely beyond regulation. Modest planned development which minimizes the wholesale change of land use typified by sprawl is the most reasonable course of action.

## 4.42 Wastewater Disposal

### 4.421 Past & Current Practices

Pre-1974 development in North Branford occurred without the benefit of full time professional services in the regulation of on-site disposal systems. As was the rule in small towns, various individuals functioned in the role of health officer or sanitarian and attempted to carry out the intent of the State code subject to their own personal training, energies, and available time. The record keeping that exists indicates that the town shares in the experience of most towns of learning by trial and error. Because the suburban phenomenon was relatively new, the long term magnitude of the on-site disposal problem was not foreseen. Only in the intervening years has the attention of professional soil scientists and engineers come to research the use of septic systems and develop a data base of their experiences that can be shared.

Many early developments have since evidenced common problems with on-site disposal. These problems include:

-- Small lot size that limits rehabilitation options

-- Development on filled or stripped land with inherent high groundwater problems or poor percolation capabilities

-- Cut and fill development on hillsides where disturbed soil was used for leaching fields and the uphill lot drains to the downhill lot.

Even in the newer developments, with larger lot sizes, septic systems have been built where uphill drainage floods the leach field or inadequate down-slopes soil cover permits breakout.

### 4.422 Continuing Limitations

As noted elsewhere, the overall problem of managing septic systems includes proper design, inspection of construction, and proper use. Also, accurate record keeping is a necessity if the analysis of long term performance is to benefit future management. Since the utilization of the East Shore Health District Office, as agent for North Branford on septic system regulator, these areas are now under more consistent control. Experience elsewhere suggests that the role of this agency will have to grow in the future if long term reliability of on-site disposal is to be assured. Because so much in this area depends upon individual decisions and actions, the continuing education of the homeowner must be pursued. This is especially true in the case of North Branford where so many residents have misgivings, or in some cases, lack of confidence in the use of on-site wastewater disposal.

# SECTION 5.0

## ENVIRONMENTAL CONSEQUENCES

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This Section documents the environmental impacts of the alternatives that remain after the initial screening process. In keeping with the new CEQ regulations, a deliberate effort is made to focus on those areas of impact which are most relevant to this specific project. Impacts are identified using differing frames of reference. Direct, indirect, short term and long term impacts must be identified and evaluated. Emphasis is placed in those areas where the impacts on North Branford are most significant.

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## 5.1 General Discussion of Impacts of Alternatives

In this section, the environmental consequences or impacts of various feasible alternatives are explored in greater depth. The alternatives that are examined here are the product of the screening that took place in Chapter 3.0. A number of considerations must be kept in mind when identifying impacts.

- -- Direct impacts are the environmental consequences which are caused by the action and generally occur at the same time and place as the action.
- -- Indirect impacts are environmental consequences which may be caused, in part, by the action. In this analysis they are limited to those which are reasonably foreseeable. They are generally removed from the action in time and/or distance.
- -- Significant impacts may be direct or indirect environmental consequences of an action which violate laws or governmental standards, policies, or plans, or create unknown risks to the general environment or injury to a unique environment.
- -- Minor impacts are those environmental consequences which are readily identifiable, but do not weigh heavily in the selection of an action.
- -- Moderate impacts are environmental consequences of an action that are of concern in decision making, but are of less importance than significant ones.

The most readily identifiable are those direct impacts which occur at the time of an action which can be fairly accurately predicted. Other impacts which may be more difficult to predict are those indirect environmental consequences of an action which may occur, more often than not, some time in the future or over an elapsed period of time. The identification of the impact does not, however, complete the process. Assigning significance to the impact involves another level of judgement. These considerations are briefly discussed in the sections that follow.

Examples of direct impacts of implementing wastewater treatment alternatives are fairly easy to recognize. Sewering an area of chronic septic system problems, whose causes are basic physical site limitations, can logically be seen as a positive local water quality improvement. The construction activity that accompanies installation of the sewers, such as the digging of the roadway or laying of pipe through undeveloped woodland, is typically a negative impact which may be short lived if proper precautions are taken.

Indirect environmental consequences or impacts are generally more difficult to pinpoint. For example, opponents of sewers will argue that the sewer system will lower local groundwater. While this may seem a logical consequence, determining actual heights for the water table, and more importantly, the significance of the impact is more speculative. Lowering the water table and eliminating a history of flooded basements may be seen as a real improvement to some homeowners. To the purist, however, any change in the environment may be seen as a violation of the natural order of things. This example serves to illustrate the point that even the direction of an impact, positive or negative, is not necessarily a fixed, given fact. The evaluation of an impact must be linked to an identified environmental value.

The identification and evaluation of indirect consequences is even more difficult in the area of non-physical impacts. Many times, the prediction of the impact depends upon imperfectly known processes, future public decisions, and a sort of concensus politics. The area of land development consequences of alternatives to wastewater management is a good example. The potential impact of sewer construction upon land development has caught the public attention recently. The phenomenon that has been identified in different parts of the country is that sewer construction "feeds" rapid development, which in turn, increases taxes. While this general relationship may occur frequently enough to warrant caution by concerned citizens, its importance is great enough to warrant a closer look. At the local level, the importance of the individual components of growth must be evaluated. Included are the overall growth of the region, the cost of land and housing, access to major roadways, amenities and prestige of individual communities, and local zoning and growth policy.

In evaluating the environmental consequences of the alternatives under consideration, the direction of the impact and its significance will be identified and the basis upon which the judgement was made will be discussed. In keeping with the intent of the new CEQ regulations, the analysis focuses on those areas of impact which have been determined to be most relevant to this study.

In the previous section, general concepts were analyzed in terms of their feasibility and potential impact. Some of those concepts were judged to be inappropriate on the basis of technical feasibility, overall costs, or significant impact. In this section, the remaining alternative concepts are sharpened to fit the reality of the problems that were identified. The alternatives are then analyzed for their overall environmental impact.

-- No Action is considered to be the continuation of present practices of wastewater disposal in the study area of North Branford.

-- Town's Proposal & Concept for Foxon is the plan for sewering that was basically identified in the 1975 Environmental Assessment Report. In the EIS analysis, the Town's Proposal is the Reduced Sewer Program that is identified in the Town's 1976 engineering report. This is the sewer system for which the Town is in the process of applying for Federal and State funds for immediate construction. In this section, the Town's Proposal is also identified with the Town's Concept for this general area. This linkage is necessary in order to analyze the future impacts of the current proposal. The Foxon Interceptor has been designed to be large enough to eventually carry wastewater from the area of the Farm River Valley north almost to Tommy's Path. Since it is the intent of the Town to build the initial 1,000 feet of interceptor with this existing capacity now, an evaluation of the Proposal and the whole Concept is appropriate.

-- Modified Foxon Proposal is an outgrowth of the preliminary analysis of Limited System and Full System concepts in Section 3.0. Because of the significant differences in the cost of these concepts and the potential environmental consequences of the Full System, it was concluded that the concept of a limited sewer system to serve primarily existing problems was a course of action worthy of further consideration.

-- Green Acres Alternatives consist of the possible on-site rehabilitation or a local sewer discharging to North Haven.

-- White Hollow Alternatives consist of the two options that are available for this area - on-site rehabilitation or local sewering with a community leaching field. Both the cross country limited sewer and full sewering concepts were eliminated in Section 3.0.

## 5.2 No Action

Under this alternative, the Town is assumed to continue with its current wastewater disposal practices. Under this management system, all new septic systems are designed to fit the requirements of the Connecticut State Department of Health under the direction of the East Shore District Health Department.

In addition, the ESDHD also oversees the repairs of older systems. Under current practice, the agency recommends differing levels of repair at different levels of cost, and, presumably, at different levels of long term effectiveness.

The basic approach of utilizing a regional agency is commendable in that full-time, objective, professionals can affect a more systematic, consistent, and vigorous approach to a town-wide management system. Some potential wastewater problems still remain, however, under this alternative. Older systems which may have been designed to standards less rigorous than those now in effect will continue to fail periodically. Some systems, new and old, will also fail under misuse.

### 5.21 Future Development Scenario

The future conditions in North Branford as they relate to wastewater problems and issues are summarized in the No Action scenario. With the information that is presently available, it is expected that the population of the Town will expand from 12,650 estimated in 1980 to 15,250 people by the year 2000. These are the estimates of the Regional Plan and seem responsive to conditions as they exist now. The most important question for this study is how this new development will affect water quality. Also, questions of how the continuation of current wastewater management practices, assumed under the No Action alternative, will affect the general environment are to be considered.

It is assumed that the increase of 2,600 people will be accommodated in the following way. As presumed in the Town Plan, about 20% of the housing starts that will be built in the period will be some form of multi-family. It was assumed that this development would most likely be provided in Area A where a sewer system was recently constructed. Using guides of 3.5 people per single family unit and 2.65 people per multi-family unit, the new development to be expected by the year 2000 amounts to 645 single family units.

Examination of post 1960 development patterns in North Branford shows that this development has been fairly evenly distributed among the Town's Areas A, B, and C. An analysis of remaining undeveloped residential land, and areas of significant environmental constraint shown in Table 5-1, however, shows that remaining vacant land is not evenly distributed. The allocation of new single family housing is projected in Table 5-1 based on future development in proportion to the amount of vacant residential land remaining.

Within the two areas of most concern to the EIS study, Areas B and C, the actual development potential of the vacant site was assessed. As a consequence, it was concluded that in Area B, the Foxon Area, that about half of the available land has good development potential (large, contiguous holdings in "open" areas - hillsides or valley). The potential for the 297 units under the No Action alternative would comprise about 40% of the "good land" within Area B. This land is generally found north of Mill Road For purposes of comparison, this amount of development would equal about 20 or 10 developments the size of Miller/Grant Roads.

TABLE 5-1

AVAILABLE LAND & ANTICIPATED DEVELOPMENT

(in single family units)

| | Area A | Area B | Area C | Total |
|---|---|---|---|---|
| Residential Capacity (Zoning) | 554 | 1,418 | 1,253 | 3,225 |
| Residential Capacity & Environmental Constraints (a) | 436 | 1,276 | 1,059 | 2,771 |
| Anticipated Development under NO ACTION | 103 | 297 | 245 | 645 |

Source: Anderson-Nichols & Company, Inc. 1978

a. The environmental constraint concept is discussed in Section 4.12

In Area C, the projected development would consist of 245 units. While most of the recent development has been in the Upper Farm River Valley, Area C-3, the fact that the C-1 area, in and around Carlen Drive, is proposed for sewering, would have an effect on the future distribution of new housing. While the remaining capacity of the C-1 area, under zoning is about 195 units and that of C-3 is about 743 units, the presence of a sewer system in the C-1 area should stimulate some in-filling of that area to a greater degree than its proportionate share of vacant land would indicate. In addition, of the 743 units that are possible in terms of vacant land, only about 50% of the land has been classified as having "high development potential". Consequently, the apportionment of the anticipated growth in housing units was designated as 35% in the C-1 area and 65% in the C-2/C-3 areas. This has the effect of giving double weight to the potential for development in the C-1 area due to the presence of the sewers.

The number of new housing units in the Farm River Valley portion of this sub-area would be about 160 homes. Most of these would be built in the Upper Valley and would utilize about 50% of the land with good development potential in the sub-area. This would be the equivalent of about 5 subdivisions the size of Holly Mar Hill Road.

## 5.22 Impacts on Water Resources of No Action

### 5.221 Public Health

Nature of Impact

- significant
- direct
- negative
- long term

Basis of Evaluation

The determination was made because raw sewage is being discharged into water that is ultimately used for water supply. This chronic problem in the lower Farm River Valley has been substantiated by the admissions of local residents (Appendix A), by EIS field surveys, and other previous field work (Appendix D). The problem has also been confirmed by water quality data (Appendix B). Site 9 in the Arthur Court Area consistently had the highest bacteriological measurements of the whole Town. While the measures are only indicative of the presence of human waste, and are not necessarily harmful in themselves, they indicate that a potential pathway for the transmission of disease exists. While the actual probability of a disease outbreak is unknown, the existence of this threat is enough to warrant an evaluation as a significant impact.

The public health may be affected in two areas. Within the residential neighborhoods, the risk remains that children in particular could come in contact with, or ingest disease bearing water. The entire area is served with public water, however, reducing the risk of wide-spread infection. The long term complication arises from the fact that one of the sources of the public water supply of the New Haven Water Company is this watershed. As noted in Section 4.41, water is diverted directly from the Farm River, at a point about two miles downstream from this developed area.

The actual magnitude of this risk to the neighborhoods and the general water supply is difficult to assess. Actual documentation of serious disease outbreak among children playing in such areas is lacking. Bacterial measures from the Lake Saltonstall Reservoir to which Farm River water is diverted, are well within safe limits prior to disinfection. This is not surprising considering dilution effects and probable attrition of bacteria.

Ultimately, due to many unknowns, the application of a conservative public health type criterion seems most appropriate. Present practice of yearly streambelt surveys for the specific purpose of detecting failed septic systems highlights the concern over the long term risk. While the indicator bacteria themselves may be in low concentration at the reservoir, the risk of transmitting disease causing bacteria and viruses remains.

### 5.222 Future Water Supply

Nature of Impact

- -- moderate
- -- indirect
- -- negative
- -- long term

Basis of Evaluation

Because it is assumed that construction of new septic systems will be more reliable than that of older homes, the risk of bacterial contamination would remain at present levels. The risk of long term chemical contamination from the many so-called "non-point sources" that accompany development in general would increase when compared to undeveloped land. The reasoning that leads to this conclusion is based on generally accepted "average or typical" values for runoff which show parameters, such as bacteria, sediment, and nutrients to exist at higher levels where higher densities of land use are found. The rather obvious extension of these findings is the conclusion that a higher likelihood exists that more complex substances, such as asbestos, lead, petroleum products, and other materials in house use, such as solvents and cleansers will reach the waterways in areas of greater population densities. The risk element is the unknown and ultimately determines the significance of this impact. While it is likely that this impact would only be evident after a long period of time, and even then only at trace levels, if at all, the impact was assigned a moderate rating because of the unknown but low probability.

One dilemma that should be recognized in evaluating the water quality impacts of new development is the potential impacts that farm use in the area presents. On an acre-by-acre basis, farming often introduces more bacteria, BOD, and nutrients than does even high density residential land use. Farm management techniques can be implemented which will significantly reduce these pollutants.

## 5.23 Impacts on Natural Systems of No Action

### 5.231 Wetlands

Nature of Impact

- -- minor
- -- indirect
- -- negative
- -- long term

Basis of Evaluation

North Branford now exercises control over wetlands under Connecticut law. The wetlands map was adopted by the Town in 1974. While older development, such as Arthur Court, did directly infringe on wetland areas (with resultant wastewater disposal problems), all new development comes under the review of the local conservation commission. Most of the newer development has not been in these areas. Where proposed development borders on wetland, the conservation commission exercises the power to minimize the environmental impact.

### 5.232 Existing Habitat

Nature of Impact

- -- moderate
- -- indirect
- -- negative
- -- long term

Basis of Evaluation

The utilization of undeveloped land on or along the margins of farm land in the Farm River Valley will result in the loss of productive habitat for small birds and mammals. Based upon total acreage within Areas B and C, the areas where most development will occur, the anticipated development would utilize approximately 500 acres of existing animal habitat. From past experience, much of this would consist of development in open fields.

## 5.24 Impacts on Human Resources of No Action

### 5.241 Farmland

Nature of Impact

-- moderate
-- indirect
-- negative
-- long term

Basis of Evaluation

The basis for this conclusion is the interaction of the process of anticipated residential growth and presence and location of the farmland resource which is described in Section 4.225. The anticipated development of 297 units in Area B, most likely within the Middle Farm River Valley, would create pressure to convert some of this farmland for home sites. In the past, the land has been partially protected by the economic viability and stability of large holdings. Small developments have occurred within and on the margins of these large holdings with only a few large scale developments being built. This relative stability has also been aided by the special tax status that applies to much of this land.

Several factors have changed which increase the possibility that farm land may come under pressure to develop. In the past, the hillside areas were frequently developed where the cost of land was less. Often, however, these lots were not well suited for septic systems.

With increased local concern about more rigorous regulation of on-site systems and with recent down-zoning, the valley areas may come under increased pressure for development. If all of the development in the B area occurred on agricultural land, the 297 units would occupy almost 1/3 of the 1,085 acres of existing farmland in the middle part of the valley. In the C Area, the impact will be less in terms of acreage (about 160 acres), but the relative impact on farmland could be great due to the tendency to develop cleared land first.

### 5.242 Planned Development

Nature of Impact

-- moderate
-- indirect
-- negative
-- long term

Basis of Evaluation

While the anticipated residential development identified in the preceding section would be generally in agreement with local plans and zoning, the form that it would be likely to take would not be in concert with general contemporary planning objectives. If the Town has as general goals of encouragement of economic development, greater diversity in housing stock, and preservation of its "character", then the anticipated development is not likely to serve these goals under this alternative. The single family residential development will occur on one acre minimum size lots in the valley on good soils. While industrial development on remaining vacant industrial land is possible utilizing septic systems, the absence of public sewers does restrict the range of possible uses that may be made of this land. While the new zoning may permit special uses, such as planned unit development in R 40 areas, it is questionable that such a use would materialize where sewers were not available.

### 5.243 Economic Growth

#### Nature of Impact

-- minor
-- direct
-- negative
-- short term

#### Basis of Evaluation

About 150 acres of vacant industrial land remain within the B and C areas. While it is possible to develop the land utilizing only on-site waste disposal systems under this alternative, the range of uses of the site are significantly reduced. Also, the economic gains of any industrial development could easily be offset by the low density single family development that has the potential to generate more municipal costs to service than tax revenue. On a town-wide basis, the significance of this impact is lessened by the fact that there is available vacant industrial land in Area A which will have sewer service.

### 5.244 Community Character

#### Nature of Impact

-- moderate
-- indirect
-- negative
-- long term

#### Basis of Evaluation

This determination was made because of local public input. Residents who live in the lower Farm River Valley in particular have complained of the problem of overflows and odor. These views have been expressed repeatedly at the EIS workshops (Appendix A). At one public meeting of the Sewer Authority, the EIS team was presented with a petition signed by numerous residents of the area who were complaining about the magnitude of septic system problems in the Arthur Court area.

In addition to the extent that the No Action alternative will result in continued growth without incorporating specific community goals, the character of the community will be affected. Presently, both growth and no-growth advocate positions have been taken by local groups with no attempt to reconcile their differences in a positive planning approach.

## 5.3 Town Proposal and Concept for Foxon Area

This alternative is the actual project for which the Town was prepared to make a grant application for construction funding. This is the project which was the subject at a preliminary review by the Connecticut DPW and was cited for a number of environmental questions which ultimately led to the EIS.

The Proposal called for the immediate construction of a gravity interceptor along Burrs Brook to the Middle School area (Figure 1-3) which would serve the Arthur Court and Sunset Lane problem areas (B-1 area). In the most recent description of the Proposal, (Reduced Sewer Program) it was also intended to immediately connect Merrimack Drive and Katherine Street which were also described in the report as "problem areas". Provision was also made to serve Judson Drive and the nearby Pioneer Drive and Williams Road areas which are referred to as the B-2 area.

An additional aspect of this Proposal includes the provision in the Burrs Brook interceptor to accommodate future flows from a contiguous area at the Farm River Valley drainage north of Foxon Road. This aspect of the Town's Proposal has been referred to here as the Town's Concept since the immediate Proposal is designed with the idea of ultimately including flows from the Middle Farm River Valley area. This area which we will call the Middle Valley includes portions of East Haven and would contribute 78.5% of the total flow that would ultimately be carried to East Haven. The design of the interceptor, and its relationship to growth, for this future flow was the major point which the Connecticut DEP environmental review noted.

The Town's Proposal alone does not, however, completely remove the risk of a public health hazard to the Farm River watershed. The proposed sewer system itself could be subject to malfunction which conceivably could result in overflow of sewage to the waterway. Because, however, the proposed system is a gravity system of modern design including sealed manholes in the vicinity of flood plains and cast iron construction throughout, the likelihood of such an accident is remote. By comparison, the continued malfunction of antiquated marginal on-lot systems in the Foxon area has a much greater threat of occurrence.

### 5.312 Future Water Supply

Nature of Impact

-- moderate
-- indirect
-- negative
-- long term

Basis of Evaluation

The Town's Proposal to provide sewers in the southern portion of Area B to relieve existing malfunctioning septic systems will permit and encourage new development of residential land use in areas that are largely either vacant woodland, brushland or cropland. Conversion from woodland/brushland to residential land use will result in increases in most pollutants (bacteria, solids, BOD, COD, nutrients, metals, pesticides and herbicides). Conversion of cropland may, however, result in reductions in existing pollutant loads. On the balance, given the larger amount of vacant woodland and idle farmland in the southern part of the valley, a net increase in the overall pollutant loads to the local waterways should be expected.

The basic question that surrounds this reserve capacity is the assumption that the whole Middle Valley will eventually require sewering. Though several large subdivisions exist in this area, no evidence was advanced during the EIS project to support the argument that on-site disposal is unsuitable there. In fact, it has been pointed out that good soils generally exist in this area. It would appear that the primary basis for this aspect of the overall plan was the common engineering practice of planning for the eventual expansion of sewers within a natural drainage area.

## 5.31 Impacts on Water Resources of Town Proposal and Concept

### 5.311 Public Health

Nature of Impact

- -- significant/minor
- -- direct
- -- positive
- -- long term

Basis of Evaluation

The implementation of the Town's Proposal would have the direct beneficial impact of protecting water supply. Quantifying this benefit is not possible, however, since the present risk is unknown. It is known that the vast majority of chronically failing and overflowing septic systems which constitute the health threat occur in the areas to be served by the present Town's Proposal for the Foxon area.

Extending this evaluation of the Town's ultimate concept for the Middle Valley, extension of the sewer system, from Foxon does not result in a proportionate gain in benefits. There are far fewer homes with chronic problems in this area. The homes with problems are farther away from the streams and the Lake Saltonstall intake, thereby decreasing the actual health threat of these areas.

The Town's Concept to eventually extend sewering throughout the Middle Valley would also have a negative impact on preserving the "purity" of the surface water for future water supply. On first glance, it would appear that conversion of much of the open farmland to residential use would result in significant negative changes in water quality due to "urban" types of non-point pollutants (solids, road salt, metals, oils). However, much of this land is in active farming and has itself the potential for significant pollution. The resolution of the question as to which form of land use, residential or agricultural, is preferable cannot be practically resolved (See Section 5.42). On the balance, however, the decentralization of land use control that would accompany subdivision of the area, and the loss of future management options that entrenchment by residential land use would create, leads to the conclusion that the overall impact of the Town's Concept for area-wide sewers on future water supply would be negative.

## 5.32 Impacts on Natural Systems of Town Proposal and Concept

### 5.321 Wetlands

-- minor/moderate
-- direct
-- negative
-- short/long term

Basis of Evaluation

The sewer routing for both areas is along the natural drainage course to obtain the benefit of gravity flow. In the area of the Town's Proposal, the problem areas are located in close proximity to Burrs Brook and the route of the pipe is the most logical choice. Here the narrow wetlands will be subject to disruption during construction both by the digging of the pipe trench and by the movement of construction equipment. The impacts would be in the areas of disruption of vegetation. Flood storage capabilities of these wetlands should remain the same.

In the area of the Town's Concept, the impacts are seen as more significant. There the present concept would locate the interceptor close to the Farm River throughout its course transversing wetlands along the route. Unlike the Arthur Court area, the Farm River wetlands are continuous and situated in undeveloped land providing potential animal habitat.

#### 5.322 Existing Habitat

Nature of Impact

- -- minor/moderate
- -- indirect
- -- negative
- -- long term

Basis of Evaluation

The Town's Proposal will result in the filling-in of now undeveloped forest/brushland and cropland by induced residential development. These lands now provide habitat for birds and small mammals of the area. The impact of the Town's Concept is considerably more significant because it assumes that most of the Middle Valley will be developed as residences. Providing sewer service to undeveloped land can create speculative forces that can tip the balance of normal market forces and make growth predictions self-fulfilling (See Section 4.3). Much of the land to be served by the Town's Concept both in North Branford and in East Haven is now in an undeveloped or an agricultural state. The value of this land as habitat would be lost if typical suburban development proceeds in the area.

### 5.33 Impacts on Human Resources of Town Proposal and Concept

#### 5.331 Farmlands

Nature of Impact

- -- minor/significant
- -- indirect
- -- negative
- -- long term

### Basis of Evaluation

In the Foxon area of the Town's Proposal, there are a number of large agricultural holdings along Route 80 that might be expected to readily convert to other uses. Many of these parcels are not covered by the Use Value Land Assessment Program of Connecticut, Act 490, and may be land that is being held for speculation. Of the two large parcels that are under the program, only one is actual farmland and this has recently been re-zoned for industrial use. For these reasons, it is believed that the Town's Proposal will act as the catalyst which hastens the development of these lands.

The Town's Concept poses a much more significant threat to the loss of land in the Middle Valley. As shown in the past on the General Land Use Map (Figure 4-3), large acreages of farmland can still be found. Additional acreage of actual farmland also exist which is not shown on this map (map includes only those holdings under Act 490). In this area, the prospect of sewers could seriously affect the long term integrity of this unique physical, economic, and cultural resource.

## 5.332 Planned Growth

### Nature of Impact

- minor/moderate
- indirect
- positive/negative
- long term

### Basis of Evaluation

The Town's Proposal alone would have a tendency to encourage concentration of anticipated development on the southern part of the Farm River. In addition, the provision of sewer service could result in a move toward more innovative housing types permitted under present zoning. There is no assurance, however, that a positive step would be taken under the Town's Proposal to implement this type of planning objective.

The Town's Concept, on the other hand, has the potential for the perpetuation of sprawl type development which has been characterized as both inefficient and unattractive. The Town's Concept of ultimately sewering most of the Middle Valley is in fact in conflict with the recent zoning revision which has its basis in guiding development by the physical constraints that may exist for on-site disposal.

### 5.333 Economic Growth

Nature of Impact

-- moderate/minor
-- indirect
-- positive/negative
-- long term

Basis of Evaluation

Sewering of the Foxon area along Route 80 would encourage development of the remaining industrially zoned land in the area. The presence of sewers would serve as an inducement for development particularly of the industrial zone south of the Middle School where soil limitations for on-site septic systems are indicated. The degree to which the development will materialize depends on many factors, such as the marginal benefits that a firm may derive from locating in North Branford as opposed to another town. In addition, the benefits to be derived by the Town will vary depending on the type of business.

The residential development that will be stimulated by the construction of a sewer system will have equally uncertain benefits. If development proceeded strictly as the zoning indicates, much would consist of one acre residential. It is unlikely that this development will result in economic benefit to the community. The costs of Town services required by a young family typically exceeds the tax revenue that the property generates. If, however, the presence of the sewer system results in the development of some alternative housing, such as a PUD development, then potential would exist for the economic benefits to exceed the liability.

# TABLE OF CONTENTS

PAGE

## SECTION 1.0 - SUMMARY

1.1 General Discussion........................ 3 1/B8
1.2 Federal and State Programs.............. 3 1/B8
1.21 P.L. 92-500.............................. 5 1/B10
1.22 Construction Grants Program............. 5 1/B10
1.23 PRM 78-9................................. 6 1/B11
1.24 1977 WPCA Amendments.................... 6 1/B11
1.25 State Program and Responsibilities...... 7 1/B12
1.3 Local Involvement........................ 8 1/B13
1.31 Town Plan of Development................ 9 1/B14
1.32 Town Sewer Plans......................... 9 1/B14
1.33 Environmental Review Process............ 11 1/C2
1.4 EIS Work Program........................ 12 1/C3
1.41 Issues................................... 12 1/C3
1.42 Public Participation Program............ 15 1/C9
1.421 Newsletters.............................. 15 1/C9
1.422 Questionnaire............................ 16 1/C10
1.423 Workshops................................ 17 1/C11
1.43 General Data Collection................. 18 1/C12
1.44 EIS Field Work.......................... 18 1/C12
1.441 Windshield Surveys...................... 19 1/C13
1.442 Connecticut DEP Survey.................. 19 1/C13
1.443 Follow-up Survey........................ 20 1/C14
1.444 Water Quality Sampling.................. 21 1/D1
1.5 Overview of Analysis of Alternatives............................ 25 1/D9
1.51 General Alternative Concepts............ 27 1/D11
1.52 Potential Impacts of Alternatives............................ 27 1/D11
1.53 Screening of Alternatives............... 28 1/D12
1.54 Conclusions............................. 29 1/D13

## SECTION 2.0 - PURPOSE AND NEED

2.1 Precipitating Action.................... 33 1/E3
2.2 EIS Findings............................ 33 1/E3
2.3 EIS Recommendations..................... 33 1/E3

## TABLE OF CONTENTS (Cont'd)

PAGE

### SECTION 3.0 - ALTERNATIVES INCLUDING THE PROPOSED ACTION

3.1 General Discussion of Alternatives...... 37 1/E7
3.2 No Action................................ 37 1/E7
3.3 On-Site Solutions....................... 37 1/E7
3.31 Changes in Use of the Existing Septic Systems........................... 38 1/E8
3.32 Repairs to Septic Systems............... 39 1/E9
3.33 Expansion of Existing Systems........... 39 1/E9
3.34 Replacement of the Leaching Field....... 39 1/E9
3.35 Site Modification/Curtain Drains........ 40 1/E10
3.36 Mounded/Pumped Systems.................. 40 1/E10
3.37 Summary................................. 41 1/E11
3.4 Local Sewer Systems..................... 41 1/E11
3.5 Town-Wide Sewer System.................. 42 1/E12
3.6 Development of Alternatives for North Branford.......................... 43 1/E12
3.61 Problem Areas........................... 43 1/E12
3.62 Alternative Concepts.................... 47 1/F6
3.63 Foxon Area Alternatives................. 48 1/F7
3.631 Foxon Alternative A - Continued On-Site.................................. 49 1/F8
3.632 Foxon Alternative B - Community System.................................. 49 1/F8
3.633 Foxon Alternative C - Limited Sewer System............................ 49 1/F8
3.634 Foxon Alternative D - Full Sewer System.................................. 49 1/F8
3.64 Green Acres Area Alternatives........... 53 1/F12
3.641 Green Acres Alternative A - Continued On-Site....................... 53 1/F12
3.642 Green Acres Alternative B - Sewer System............................ 53 1/F12
3.65 White Hollow Area Alternatives.......... 55 1/F14
3.651 White Hollow Alternative A - Continued On-Site....................... 55 1/F14
3.652 White Hollow Alternative B - Community Systems...................... 55 1/F14
3.653 White Hollow Alternative C - Limited Sewer System.................. 55 1/F14
3.654 White Hollow Alternative D - Full Sewer System..................... 55 1/F14

## TABLE OF CONTENTS (Cont'd)

PAGE

3.66 Potential Impacts of Alternatives....... 59 1/G4
3.661 Public Health........................... 59 1/G4
3.662 Aesthetics.............................. 59 1/G4
3.663 Potential Habitat....................... 59 1/G4
3.664 Future Water Supply..................... 60 1/G5
3.665 Wetlands................................ 60 1/G5
3.666 Existing Habitat........................ 60 1/G5
3.667 Farmland................................ 60 1/G5
3.668 Planned Development..................... 60 1/G5
3.669 Economic Growth......................... 60 1/G5
3.6610 Community Character.................... 60 1/G5
3.6611 Cost Effectiveness..................... 60 1/G5
3.6612 Conformance with PRM's................. 61 1/G6
3.6613 Local Acceptance....................... 61 1/G6
3.6614 Future Provisions...................... 61 1/G6
3.6615 Ease of Management..................... 61 1/G6
3.6616 Individual Expense..................... 61 1/G6
3.67 Cost Effective Analysis.................. 61 1/G6
3.68 Public Attitudes......................... 61 1/G6
3.7 Preferred Alternatives.................... 64 1/G10
3.71 Foxon Alternative A - Continued On-Site.................................. 64 1/G10
3.72 Foxon Alternative B - Community System.................................... 65 1/G11
3.73 Foxon Alternative C - Limited Sewer System............................. 65 1/G11
3.74 Foxon Alternative D - Full Sewer System.................................... 66 1/G12
3.75 Green Acres Alternative A - Continued On-Site...................... 66 1/G12
3.76 Green Acres Alternative B - Limited Sewer System.................... 66 1/G12
3.77 White Hollow Alternative A - Continued On-Site...................... 67 1/G13
3.78 White Hollow Alternative B - Community System....................... 67 1/G13
3.79 White Hollow Alternative C - Limited Sewer System.................... 67 1/G13
3.710 White Hollow Alternative D - Full Sewer System....................... 67 1/G13

## TABLE OF CONTENTS (Cont'd)

PAGE

## SECTION 4.0 - AFFECTED ENVIRONMENT

4.1 Natural Environment........................ 71 2/A10
4.11 Topography/Hydrology........................ 71 2/A10
4.12 Geology/Soils........................ 72 2/A11
4.13 General Water Quality........................ 79 2/B10
4.14 Climate........................ 81 2/B12
4.15 Air Quality........................ 81 2/B12
4.16 Sensitive Ecological Systems........................ 82 2/B13
4.2 Human Environment........................ 83 2/B13
4.21 General Land Use........................ 84 2/C1
4.211 History........................ 84 2/C1
4.212 Patterns........................ 85 2/C2
4.213 EPA Resource Inventory........................ 89 2/C9
4.22 Land Use Regulation........................ 90 2/C10
4.221 Water Company Lands........................ 91 2/C11
4.222 Zoning........................ 92 2/C12
4.223 Wetland Regulations........................ 96 2/D5
4.224 Floodplain Regulations........................ 97 2/D6
4.225 Agricultural Preservation........................ 101 2/D13
4.3 Growth & Development........................ 103 2/E1
4.31 Population Projections........................ 103 2/E1
4.32 Local Plan of Development........................ 105 2/E3
4.33 Regional Plan........................ 107 2/E5
4.34 State Plan of Conservation & Development........................ 110 2/E8
4.35 Local Perceptions of Growth........................ 113 2/E11
4.4 Characteristics of Resource Use........................ 114 2/E12
4.41 Water Supply........................ 114 2/E12
4.411 General........................ 114 2/E12
4.412 New Haven Water Company........................ 116 2/E14
4.413 Water Quality........................ 118 2/F2
4.42 Wastewater Disposal........................ 121 2/F5
4.421 Past and Current Practices........................ 121 2/F5
4.422 Continuing Limitations........................ 122 2/F6

## TABLE OF CONTENTS (Cont'd)

### SECTION 5.0 - ENVIRONMENTAL CONSEQUENCES

| | | PAGE | |
|---|---|---|---|
| 5.1 | General Discussion........................ | 125 | 2/F9 |
| 5.2 | No Action................................. | 128 | 2/F12 |
| 5.21 | Future Development Scenario.............. | 129 | 2/F13 |
| 5.22 | Impacts on Water Resources............... | 131 | 2/G1 |
| 5.221 | Public Health............................ | 131 | 2/G1 |
| 5.222 | Future Water Supply...................... | 133 | 2/G3 |
| 5.23 | Impacts on Natural Systems............... | 134 | 2/G4 |
| 5.231 | Wetlands................................. | 134 | 2/G4 |
| 5.232 | Existing Habitat......................... | 134 | 2/G4 |
| 5.24 | Impacts on Human Resources............... | 135 | 2/G5 |
| 5.241 | Farmland................................. | 135 | 2/G5 |
| 5.242 | Planned Development...................... | 136 | 2/G6 |
| 5.243 | Economic Growth.......................... | 137 | 2/G7 |
| 5.244 | Community Character...................... | 137 | 2/G7 |
| 5.3 | Town Proposal & Concept for Foxon Area............................... | 138 | 2/G8 |
| 5.31 | Impacts on Water Resources............... | 139 | 2/G9 |
| 5.311 | Public Health............................ | 139 | 2/G9 |
| 5.312 | Future Water Supply...................... | 140 | 2/G10 |
| 5.32 | Impacts on Natural Systems............... | 141 | 2/G11 |
| 5.321 | Wetlands................................. | 141 | 2/G11 |
| 5.322 | Existing Habitat......................... | 142 | 2/G12 |
| 5.33 | Impacts on Human Resources............... | 142 | 2/G12 |
| 5.331 | Farmlands................................ | 142 | 2/G12 |
| 5.332 | Planned Development...................... | 143 | 2/G13 |
| 5.333 | Economic Growth.......................... | 144 | 2/G14 |
| 5.334 | Community Character...................... | 145 | 3/A8 |
| 5.4 | Modified Foxon Proposal.................. | 146 | 3/A9 |
| 5.41 | Impacts on Water Resources............... | 147 | 3/A10 |
| 5.411 | Public Health............................ | 147 | 3/A10 |
| 5.412 | Future Water Supply. .................... | 148 | 3/A11 |
| 5.42 | Impacts on Natural Systems............... | 148 | 3/A11 |
| 5.421 | Wetlands................................. | 148 | 3/A11 |
| 5.422 | Existing Habitat......................... | 149 | 3/A12 |
| 5.43 | Impacts on Human Resources............... | 149 | 3/A12 |
| 5.431 | Farmlands................................ | 149 | 3/A12 |
| 5.432 | Planned Development...................... | 150 | 3/A13 |
| 5.433 | Economic Growth.......................... | 150 | 3/A13 |
| 5.434 | Community Character...................... | 151 | 3/A14 |

# TABLE OF CONTENTS (Cont'd)

| | | PAGE | |
|---|---|---|---|
| 5.5 | Green Acres Area Rehabilitation......... | 151 | 3/A14 |
| 5.51 | Impacts on Water Resources.............. | 152 | 3/B1 |
| 5.511 | Public Health........................... | 152 | 3/B1 |
| 5.512 | Future Water Supply..................... | 152 | 3/B1 |
| 5.52 | Impacts on Natural Systems.............. | 152 | 3/B1 |
| 5.53 | Impacts on Human Resources.............. | 152 | 3/B1 |
| 5.531 | Farmlands............................... | 152 | 3/B1 |
| 5.532 | Planned Development..................... | 153 | 3/B2 |
| 5.533 | Economic Growth......................... | 153 | 3/B2 |
| 5.534 | Community Character..................... | 153 | 3/B2 |
| 5.6 | Green Acres Area Sewer Systems.......... | 153 | 3/B2 |
| 5.61 | Impacts on Water Resources.............. | 154 | 3/B3 |
| 5.611 | Public Health........................... | 154 | 3/B3 |
| 5.612 | Future Water Supply..................... | 154 | 3/B3 |
| 5.62 | Impacts on Natural Systems.............. | 154 | 3/B3 |
| 5.621 | Wetlands................................ | 154 | 3/B3 |
| 5.622 | Existing Habitat........................ | 155 | 3/B4 |
| 5.63 | Impacts on Human Resources.............. | 155 | 3/B4 |
| 5.631 | Farmland................................ | 155 | 3/B4 |
| 5.632 | Planned Development..................... | 155 | 3/B4 |
| 5.633 | Economic Growth......................... | 155 | 3/B4 |
| 5.634 | Community Character..................... | 156 | 3/B5 |
| 5.7 | White Hollow Area Rehabilitation........ | 156 | 3/B5 |
| 5.71 | Impacts on Water Resources.............. | 156 | 3/B5 |
| 5.711 | Public Health........................... | 156 | 3/B5 |
| 5.712 | Future Water Supply..................... | 157 | 3/B6 |
| 5.72 | Impacts on Natural Systems.............. | 157 | 3/B6 |
| 5.721 | Wetlands................................ | 157 | 3/B6 |
| 5.722 | Existing Habitat........................ | 157 | 3/B6 |
| 5.73 | Impacts on Human Resources.............. | 157 | 3/B6 |
| 5.731 | Farmland................................ | 157 | 3/B6 |
| 5.732 | Planned Development..................... | 157 | 3/B6 |
| 5.733 | Economic Growth......................... | 157 | 3/B6 |
| 5.734 | Community Character..................... | 158 | 3/B7 |

## TABLE OF CONTENTS (Cont'd)

| | | PAGE | |
|---|---|---|---|
| 5.8 | White Hollow Area Community Sewer....... | 158 | 3/B7 |
| 5.81 | Impacts on Water Resources.............. | 158 | 3/B7 |
| 5.811 | Public Health........................... | 158 | 3/B7 |
| 5.812 | Future Water Supply..................... | 159 | 3/B3 |
| 5.82 | Impacts on Natural Systems.............. | 159 | 3/B8 |
| 5.821 | Wetlands................................ | 159 | 3/B8 |
| 5.822 | Existing Habitat........................ | 160 | 3/B9 |
| 5.83 | Economic Growth......................... | 160 | 3/B9 |
| 5.84 | Community Character..................... | 161 | 3/B10 |
| 5.9 | Conclusions............................. | 161 | 3/B10 |
| 5.91 | Foxon Area.............................. | 161 | 3/B10 |
| 5.911 | Impacts Which Cannot Be Avoided......... | 167 | 3/C4 |
| 5.912 | Mitigative Measures..................... | 168 | 3/C5 |
| 5.92 | Green Acres Area........................ | 168 | 3/C5 |
| 5.921 | Impacts Which Cannot Be Avoided......... | 170 | 3/C7 |
| 5.922 | Mitigative Measures..................... | 170 | 3/C7 |
| 5.93 | White Hollow Area....................... | 170 | 3/C7 |
| 5.931 | Impacts Which Cannot Be Avoided......... | 171 | 3/C8 |
| 5.932 | Mitigative Measures..................... | 171 | 3/C8 |
| 5.94 | Areawide................................ | 172 | 2/C9 |
| SECTION 6.0 - LIST OF PREPARERS | | 173 | 3/C10 |
| APPENDIX A | PUBLIC PARTICIPATION | | 3/D2 |
| APPENDIX B | WATER QUALITY SAMPLING | | 3/E6 |
| APPENDIX C | DESCRIPTION & ECONOMICS OF ALTERNATIVES | | 4/A10 |
| APPENDIX D | DETERMINATION OF WASTEWATER NEED | | 4/E12 |
| APPENDIX E | BIBLIOGRAPHY | | 4/G4 |

Applying the same reasoning to the Town's Concept does not lead to the same conclusions. No industrial or commercial property would benefit from the provision of sewering in the Middle Valley. While it is possible that some income-generating development might be encouraged, the bulk of the vacant land would be developed as single family homes on large lots. The market for industrial and commercial development and alternative housing is not unlimited. In addition, while the Middle Valley area might offer more on the way of amenities, it is more remote from the major transportation routes.

## 5.334 Community Character

### Nature of Impact

- -- minor/significant
- -- indirect
- -- negative
- -- long term

### Basis of Evaluation

The Town's Proposal would result in further development in the Foxon area. To residents of the area, this may be perceived as an aesthetic loss on at least two levels. First, those people whose land has abutted undeveloped land will lose the benefit that they have enjoyed in terms of privacy and "openess". Secondly, the contrasts that are now enjoyed along Route 80 where the development is interspersed with vacant or agricultural land will change with the inducement for filling-in created by a new sewer system. The Town's Concept would have a much greater effect in this area. The openess of the landscape and the farmlands that are found in the Middle Valley contribute to the "small town or rural" image that many residents desire.

## 5.4 Modified Foxon Proposal

In the previous analysis, the joint evaluation of the Town Proposal and the Town Concept was necessary in order to fully examine the implication of the Town's general sewer plans. From the analysis of problem areas (Appendix D), the cost-effective analysis (Appendix C), and the preliminary analysis of alternatives (Section 3.0), it becomes apparent that a limited sewer system is the only practical solution to the wastewater disposal problem of the Foxon area at this time.

From one persepctive, this appears to be essentially what the Town is currently proposing. Because, however, EPA must evaluate both short term and long term environmental impacts, the actual proposal for which the Town had applied for Federal and State grants had to be examined more closely. The issue of most concern was the fact that the Town Proposal assumes the ultimate sewering of most of the Farm River Valley. In addition, the Town Proposal sought funding (and still are - in the case of North Branford's application, they are still eligible) for lateral 21 funding. During the course of the EIS, this project was unable to find specific documentation of existing problems on some of these streets. This finding does not preclude the Town from building these local sewers itself, but it does raise the question of their grant eligibility. On the other hand, the EIS project recognized problems on Dorie Drive that the Town's Proposal would not serve at this time.

In order to isolate some of the conflicting impacts of the Town's Proposal and Concept and to provide a closer look at the merits of a sewer system in the Foxon area, the alternative of a Modified Foxon System will be evaluated. This is, in effect, a fine tuning of the general approach which, on the basis of solving wastewater problems in a cost-effective manner, seems reasonable.

The Modified Foxon System consists of the construction of a gravity interceptor sewer along Burrs Brook to serve the major problem area of Arthur Court and is extended to the Middle School area to serve the schools and Dorie Drive. The project would include local sewers to pick up existing and potential problems on Brook Lane and Sunset Lane, respectively. It is also assumed that the interceptor would be of sufficient size to ultimately accept flows from existing development and subsequent development in the immediate drainage area. Those areas were identified in the Town's Proposal as the B-1 and B-2 areas. The concept that is being evaluated here on its environmental merits is deliberately no more exact than the description that was just presented. The EIS study, with its requirements to cover a broad range of issues, cannot develop specific design factors, such as exact location, pipe size, and pipe slope. In the analysis, on the first cut, the EIS assumes that these elements of the Modified Foxon System are essentially those that have been developed for the Town's Proposal. The Modified Foxon System does not provide, however, for design capacity for the Middle Farm River Valley.

## 5.41 Impacts on Water Resources of Modified Foxon Proposal

### 5.411 Public Health

**Nature of Impact**

-- significant
-- direct
-- positive
-- long term

**Basis of Evaluation**

The major areas of chronic septic system failure which overflow to the Farm River will be served by the sewer system. The concept will also allow for future service in the immediate vicinity where the age of housing stock and physical site conditions suggest future problems. These problem areas are also those areas of development that are closest to the Saltonstall Reservoir intake. The remaining outlying problem areas which are remote from the sewer service area would be best served by rehabilitation of the on-site system.

### 5.412 Future Water Supply

**Nature of Impact**

- -- moderate
- -- indirect
- -- negative
- -- long term

**Basis of Evaluation**

The Modified Foxon System will significantly reduce the immediate public health threat to the Farm River water supply system. The development that the sewer system will stimulate has the long term potential of adding unknown quantities of "non-point" pollutants. The evaluation of significance of this impact is based on a conservative stance since a variety of other variables other than simple land conversion will affect the quality and use of future water supply. Included are the highly variable pollutant loads of agricultural land use, and future water treatment requirements and technologies. If the development takes place in some of the alternative forms that will be possible with sewer service, pollution levels could be reduced. Cluster type development with reserved open space can reduce the overall pollutant level of non-point services by minimizing paved surfaces.

## 5.42 Impacts on Natural Systems of Modified Foxon System

### 5.421 Wetlands

**Nature of Impact**

- -- minor
- -- direct
- -- negative
- -- short term

Basis of Evaluation

The interceptor route of the Modified Foxon System would follow that of the Town's Proposal and would pass through wetland areas along Burrs Brook. While provision has been made for mitigation of most construction impacts through written specifications for construction, some impact such as disruption of vegetation are unavoidable.

#### 5.422 Existing Habitat

Nature of Impact

- -- minor
- -- indirect
- -- negative
- -- long term

Basis of Evaluation

The development that is anticipated as part of this alternative will convert lands from wood land, brush land and agricultural uses. This action will ultimately diminish the available land for use as animal habitat.

### 5.43 Impacts on Human Resources of Modified Foxon System

#### 5.431 Farming

Nature of Impact

- -- minor
- -- indirect
- -- negative
- -- long term

Basis of Evaluation

This alternative will encourage the conversion of some land in agricultural use to residential or industrial uses. While much of this land is not under the protection of the use value program, indicating that they may be converted in any case, this sewering alternative will accelerate the process.

## 5.432 Planned Development

### Nature of Impact

- -- moderate
- -- indirect
- -- positive
- -- long term

### Basis of Evaluation

While there are no guarantees that the Town will consciously seek to maximize this opportunity, the limited sewer system would provide an opportunity to concentrate development that might otherwise take the form of sprawl in the Middle Valley. In addition, a variety of housing types could be developed based on the availability of sewer service. If this type of development were made attractive and residential growth were successfully concentrated in the area, pressure for development of the farmland in the Middle Valley could be reduced. A stronger agricultural preservation program would have to be instituted, however, to insure that the goals of diversified development could be met.

## 5.433 Economic Growth

### Nature of Impact

- -- moderate
- -- indirect
- -- positive
- -- long term

### Basis of Evaluation

This alternative would assist in the further development of the vacant industrial and commercial land by removing the difficulties and limitations of on-site disposal from the development process.

#### 5.434 Community Character

Nature of Impact

- -- moderate
- -- indirect
- -- positive
- -- long term

Basis of Evaluation

The sewer system would eliminate the nuisance problem of septic system overflow that was noted earlier. This alternative also has the potential benefit of retaining the popular image of a "rural community" through the implementation of the planning objectives noted earlier. By attracting new development to the Foxon area and taking development pressure off of the agricultural land, the community has the potential of serving several of its goals. The ability of the limited sewer system in the Foxon area to concentrate development in a planned fashion would help the community to accommodate residential growth, stimulate limited industrial development, and retain some of its rural charm.

### 5.5 Green Acres Rehabilitation

The residential development in the Green Acres area is basically large lot development. Despite the reputation that the area has for wide-spread septic problems, there are no inherent site limitations that would rule out the technical feasibility of rehabilitating the septic systems. While the area's problems are reputedly due to topsoil removal, and high groundwater is in evidence, lots are large enough to permit reconstruction of leaching fields. The basic issues surrounding this alternative are:

- -- Additional site specific information would be required to accurately estimate costs.

- -- Total costs would have to be compared with other options.

- -- Individual costs would depend upon the availability of funding.

- -- An application for this project would have to be sponsored by the Town which would assume a management role.

The environmental evaluation of the concept follows.

## 5.51 Impacts on Water Resources of Green Acres On-Site

### 5.511 Public Health

Nature of Impact

- -- moderate
- -- direct
- -- positive
- -- intermediate duration (?)

Basis of Evaluation

A deliberate commitment to sponsor area-wide rehabilitation of chronically failing septic systems would eliminate a general public health hazard of contact with contaminated surface water. A commitment of the homeowner, the Town, and the health agency would be required to make it successful.

### 5.512 Future Water Supply

Nature of Impact

- -- none

Basis of Evaluation

The Muddy River to which the area drains is not, nor is it likely to be, a source of water supply.

## 5.52 Impacts on Human Resources of Green Acres On-Site

### 5.521 Farmlands

Nature of Impact

- -- none

### 5.522 Planned Development

Nature of Impact

-- none

### 5.523 Economic Growth

Nature of Impact

-- none

### 5.524 Community Character

Nature of Impact

-- minor
-- indirect
-- positive
-- intermediate duration (?)

Basis of Evaluation

The elimination of chronic septic system problems would reduce the negative perceptions that these problems have created for the area.

## 5.6 Green Acres Area Sewer System

Because of the proximity of an interceptor sewer in nearby North Haven, the alternative of the conventional sewer was initially evaluated but found to be expensive in terms of individual costs. For this reason, a modification to the conventional sewer system was also evaluated. The major cost element in the conventional sewer is the price of digging deep trenches for gravity sewers. Because the flow is by gravity, the system requires a minimum constant slope to maintain satisfactory flow and must be buried deep to avoid freezing. By comparison, if a small diameter pressure sewer system is used, inexpensive trenching methods can be used to install the pipe and the flow is relatively independent of grade. In the case of Green Acres, the flow could be conveyed along existing roadways to the approved interceptor on Clintonville Road.

The basic sewer concept is evaluated here in terms of environmental consequences. When differences between the two approaches are significant, they are noted.

## 5.61 Impacts on Water Resources of Green Acres Sewers

### 5.611 Public Health

Nature of Impact

- moderate
- direct
- positive
- long term

Basis of Evaluation

The sewer system will eliminate malfunctioning septic system problems which are located in close proximity to surface drainage with which children could easily come in contact.

### 5.612 Future Water Supply

Nature of Impact

- none

## 5.62 Impacts on Natural Systems of Green Acres Sewers

### 5.621 Wetlands

Nature of Impact

- minor
- direct
- negative
- short term

Basis of Evaluation

Both systems would traverse about 500 feet of wetlands designated on the Inland Wetlands Map in order to intercept flows from Surrey Drive. From the developed area on Palanga and Nida Drives, the sewers would cross the vacant land to the southeast enroute to Village Street and then to Surrey Drive. Some of this vacant land is classified as wetlands according to soils mapping.

### 5.622 Existing Habitat

Nature of Impact

- -- minor
- -- direct
- -- negative
- -- short term

Basis of Evaluation

The interceptor to the North Haven Townline, paralleling Nida Drive, would traverse about 1,000 feet of woodlands and fields. While both long and short term impacts can be mitigated through design specifications, the initial disruption of vegetation and wildlife is unavoidable.

## 5.63 Impacts on Human Resources of Green Acres Sewers

### 5.631 Farmland

Nature of Impact

- -- none

### 5.632 Planned Development

Nature of Impact

- -- minor
- -- direct
- -- positive
- -- long term

Basis of Evaluation

The sewer system would permit the completion of the subdivision thus adding stability to the neighborhood.

### 5.633 Economic Growth

Nature of Impact

- -- none

#### 5.634 Community Character

Nature of Impact

- -- minor
- -- indirect
- -- positive
- -- long term

Basis of Evaluation

The "stigma" of widespread wastewater disposal problems would be eliminated.

## 5.7 White Hollow Area On-Site

Chronic problems have been identified in the area of Sky Lark Lane and Walnut Lane. These areas have been referred to here as the White Hollow Area. In the preliminary analysis, two alternatives that were identified as worthy of further study were on-site rehabilitation and the community sewer. Most of the problem sites in this area have adequate lot size to accommodate a proper septic system. In these areas the cause of the problem appears to be slope related. In some instances, the water table has been intercepted by the cutting of the hillside to level the house lot. In other cases, septic system breakout is in evidence on the slope where inadequate terracing may be the root cause. While more site work on a house-to-house basis will be necessary to implement an area-wide rehabilitation program, the environmental consequences can be evaluated here.

### 5.71 Impacts on Water Resources of White Hollow On-Site Alternative

#### 5.711 Public Health

Nature of Impact

- -- significant
- -- direct
- -- positive
- -- intermediate duration (?)

Basis of Evaluation

The numerous reported failures which are located within this portion of the Farm River watershed would be eliminated. This problem area is located just upstream of the Northford diversion to Lake Gaillard. The intermediate duration is assigned due to the dependence of this alternative upon long term management by the Town and numerous individuals.

#### 5.712 Future Water Supply

Nature of Impact

-- none

### 5.72 Impacts on Natural Systems of White Hollow On-Site

#### 5.721 Wetlands

Nature of Impact

-- none

#### 5.722 Existing Habitat

Nature of Impact

-- none

### 5.73 Impacts on Human Resources of White Hollow On-Site

#### 5.731 Farmland

Nature of Impact

-- none

#### 5.732 Planned Development

Nature of Impact

-- none

#### 5.733 Economic Growth

Nature of Impact

-- none

### 5.734 Community Character

**Nature of Impact**

- -- minor
- -- indirect
- -- positive
- -- intermediate duration

**Basis of Evaluation**

The input that we received regarding the magnitude of the impact of current failures on this area indicated that the aesthetic problem is not as severe as elsewhere in Town. Nevertheless, the area suffers to some degree with the "reputation" of having problems.

## 5.8 White Hollow Area Community Sewer System

The occurrence of septic system problems in the vicinity of Sky Lark Lane and the Walnut Lane area are widespread enough to justify an area-wide solution through sewering. Because of the distance to an existing sewer system and the environmental consequences of constructing a long interceptor, a variation of the conventional sewer system offers some potential for solving the area's problems. As conceived, this system would consist of a small diameter gravity pipe system from the septic tanks of homes in the area to either one or two leaching fields on undeveloped land along Durham Road. More information regarding the technical feasibility of the alternative would have to be developed as part of additional Step I Facility Planning.

### 5.81 Impact on Water Resources of Community Sewers

### 5.811 Public Health

**Nature of Impact**

- -- significant
- -- direct
- -- positive
- -- long term

**Basis of Evaluation**

This system would eliminate large numbers of known and potential malfunctioning septic systems.

### 5.812 Future Water Supply

**Nature of Impact**

-- minor
-- direct
-- negative
-- long term

**Basis of Evaluation**

The concentration of the area's wastewater flow in a single leaching field in close proximity to the Northford intake would have the potential of marginally increasing the chemical content of water entering the Lake Gaillard system. The only difference between the present situation and that which is proposed is the reduction of the distance between existing discharge points (individual leachfields), and the Northford intake, and the proposed discharge point (community leachfield). Under present conditions, the distance that water must travel through various soil and vegetative regimes has some unknown potential for additional wastewater renovation.

## 5.82 Impacts on Natural Systems of Community Sewer

### 5.821 Wetland

**Nature of Impact**

-- minor
-- direct
-- negative
-- short term

**Basis of Evaluation**

The eventual routing of the interceptor to the leachfield would probably cross through small stretches of wetland along the upper Farm River. It would be possible to develop alternative routing in this area because of the development patterns, slope, and proposed leachfield locations which would minimize any wetland impacts.

### 5.822 Existing Habitat

Nature of Impact

-- minor
-- direct
-- negative
-- long term

Basis of Evaluation

The routing of the interceptor from the Walnut Lane area would be likely to go through undeveloped lands for a short distance resulting in a disruption of natural vegetation.

## 5.83 Impacts on Human Resources of Community Sewer

### 5.831 Farmland

Nature of Impact

-- minor
-- direct
-- negative
-- long term

Basis of Evaluation

One of two potential leachfield sites is active farmland.

### 5.832 Planned Development

Nature of Impact

-- none

### 5.833 Economic Growth

Nature of Impact

-- none

### 5.834 Community Character

**Nature of Impact**

- minor
- indirect
- positive
- long term

**Basis of Evaluation**

This system would improve the overall image or popular perception of the area by elimination of malfunctioning septic systems.

## 5.9 Conclusions

The environmental impacts that were analyzed in the preceding sections are summarized in Figure 5-1 and Figure 5-2. When the scope of the wastewater problem is considered along with these impacts and costs, the options that are available are limited. The basic need is to solve existing problems by a solution which is environmentally sound and implementable. The first of these criteria depends upon the ultimate significance of the total impact while the latter involves a mixture of factors including total costs, grant priority, individual economic burden and general public acceptability. The final alternatives and any modifications that are necessary to mitigate the unavoidable environmental impacts are presented in the sections that follow.

### 5.91 Foxon Area

In this part of Town, chronic wastewater disposal problems necessitate the construction of a sewer system. The modified Foxon proposal responds to the demonstrated need in the area while minimizing environmental impacts. The project is also implementable in terms of financing. Some of the costs of this proposal are shown in Table 5-2.

# north branford eis
# environmental impact profile

● adverse impact

* beneficial impact

○ no impact

## figure 5-1

alternatives-type and intensity of impact

| category of impact | NO ACTION 1 | | | | TOWN PROPOSAL 2 | | | | TOWN CONCEPT 3 | | | | MOD'FD. PROPOSAL 4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NONE | MINOR | MODERATE | SIGNIFICANT | NONE | MINOR | MODERATE | SIGNIFICANT | NONE | MINOR | MODERATE | SIGNIFICANT | NONE | MINOR | MODERATE | SIGNIFICANT |
| Public Health | | | | ● | | | | * | | * | | | | | | * |
| Future Water Quality | | | ● | | | | ● | | | | ● | | | | ● | |
| Wetlands | | ● | | | | ● | | | | | ● | | | ● | | |
| Existing Habitat | | | ● | | | ● | | | | | ● | | | ● | | |
| Farmlands | | | ● | | | ● | | | | | | ● | | ● | | |
| Planned Development | | | ● | | | * | | | | | ● | | | | * | |
| Economic Growth | | ● | | | | | * | | | ● | | | | | * | |
| Community Character | | | ● | | | ● | | | | | | ● | | | * | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
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# north branford eis
# environmental impact profile

● adverse impact
* beneficial impact
○ no impact

## figure 5-2

### alternatives-type and intensity of impact

| category of impact | GREEN ACRES AREA | | | | | | | | WHITE HOLLOW AREA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | On-Site | | | | Local Sewer | | | | On-Site | | | | Local Sewer | | | |
| | 1 | | | | 2 | | | | 1 | | | | 2 | | | |
| | NONE | MINOR | MODERATE | SIGNIFICANT | NONE | MINOR | MODERATE | SIGNIFICANT | NONE | MINOR | MODERATE | SIGNIFICANT | NONE | MINOR | MODERATE | SIGNIFICANT |
| PUBLIC HEALTH | | | * | | | | * | | | | | * | | | | * |
| FUTURE WATER QUALITY | ○ | | | | ○ | | | | ○ | | | | | ● | | |
| WETLANDS | ○ | | | | | ● | | | ○ | | | | | ● | | |
| EXISTING HABITAT | ○ | | | | | ● | | | ○ | | | | | ● | | |
| FARMLANDS | ○ | | | | ○ | | | | ○ | | | | | ● | | |
| PLANNED DEVELOPMENT | ○ | | | | | * | | | ○ | | | | ○ | | | |
| ECONOMIC GROWTH | ○ | | | | ○ | | | | ○ | | | | ○ | | | |
| COMMUNITY CHARACTER | | * | | | | * | | | | * | | | | * | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

## TABLE 5-2

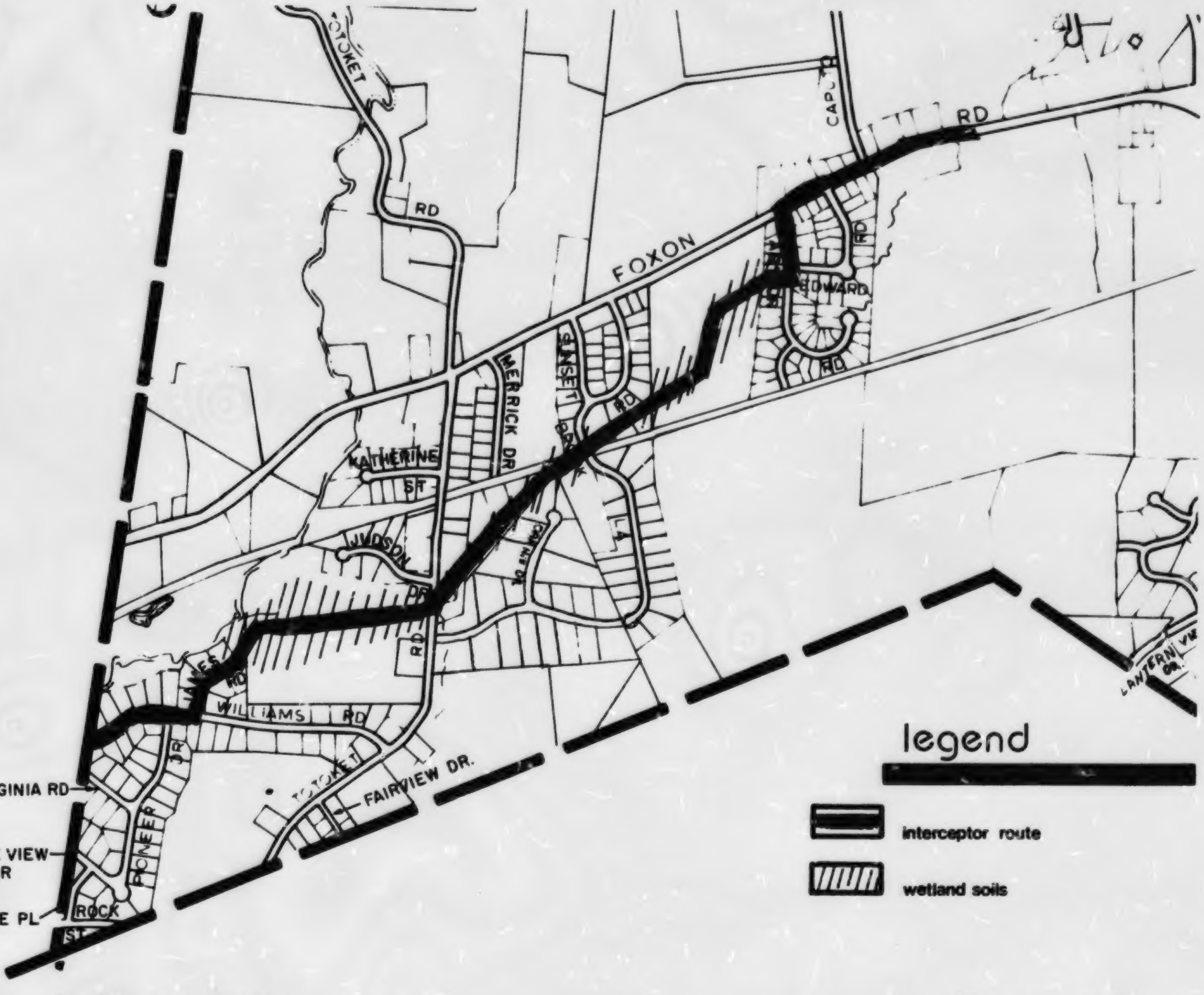
## COSTS OF MODIFIED FOXON PROPOSAL

| | |
|---|---|
| Total Cost | $1,252,160.00 |
| Federal and State Grants | 866,880.00 |
| Local Share | 385,280.00 |
| Tax Increase (Mills) | .26 |
| First Year User | 734.00 |
| Each Year Thereafter | 134.00 |

Source: Anderson-Nichols & Company, Inc., 1979

The overall impacts are listed in Table 5-1. The negative impacts that are associated with this project include direct impacts in the area of wetlands and indirect impacts in the areas of future water supply and existing habitat.

The direct impacts in the wetland category are due to the construction of the Foxon interceptor (Figure 5-3) within the wetlands designated on the Town's map, Figure 4-1, and also within the flood plain area (Figure 4-2) in places along its route. Wetland activities such as funded sewer construction may be monitored at a number of levels. In the case of the Foxon interceptor, application for the Corps of Engineers-administered 404 permit process will not be required due to the small nature of the brook. The available flow date of Burrs Brook indicates that the average annual flow would be below the 5 cfs minimum criteria for the program applicability. The impacts must, however, be considered under EPA's regulations pertaining to Executive Orders 11990 and 11988. At the local level, permits have been obtained from the Inland Wetlands Commission.


TOTOKET RD
CAPUTO
RD
FOXON
HOWARD
RD
RD
MERRICK DR
SUNSET
RD
KATHERINE ST
JUDSON DR
RD
JAMES RD
WILLIAMS RD
TOTOKET
FAIRVIEW DR.
VIRGINIA RD
PINE VIEW DR
PINE PL
ROCK ST
PIONEER DR
LANTERN VW DR.
legend
interceptor route
wetland soils

foxon interceptor

figure 5-3

north branford wastewater treatment facilities

date: february 1979

source: anderson-nichols

0 1600 3200

environmental impact statement ■ environmental protection agency

anderson-nichols & co., inc.

technical consultant

Because of the configuration of the existing developments, the gravity system along Burrs Brook is the most logical route. Because the 157 homes involved straddle the brook, the route that would require the least excavation is one which is built along the natural drainage. All other routes would require pumping. Because this gravity route traverses undeveloped land, some of which is wetland and flood plain, some direct and indirect environmental impacts have been identified. Because of the absence of any structure (pump station, treatment plant) within the flood plain, and the requirement for cast iron pipe and sealed manholes through the length of the brook, the direct flood relocated impacts of the proposed project are insignificant. Because the flood plain is quite narrow, less than 200 feet in total width along the whole brook, and 50 feet on either side fall within the restricted streambelt zone, few secondary development impacts are expected within the area where the stream traverses undeveloped land.

In the first segment of the interceptor from the East Haven townline to Totoket Road, no significant wetland impacts are anticipated. About half of this segment would be along Williams and James Roads. The remaining portion would be parallel to the brook at a distance of about 25' in a straight line through an area of gravel removal. This stretch would fall within the floodplain, but movement to higher ground to the south would require very deep trenches and would dissect a potential developable parcel.

In the second segment from Totoket Road to Brook Lane, the interceptor crosses through backyards on the north side of the brook, sometimes through treed areas and sometimes through fields or lawns. Much of this segment is technically wetlands on the basis of soil type. Much of it also falls within the 100 year floodplain.

In the third segment from Brook Lane to Arthur Road the interceptor is located on the north side of the brook crossing several backyards and a large area of cultivated field. At points the route traverses several stands of trees. Although much of this land is classified as wetland and some floodplain, most of it is cultivated land.

Throughout the length of the wetland areas that are traversed, the major value of the wetland is as floodplain. No significant natural vegetation or animal habitat will be directly affected. (The area has also been judged to be void of archaeological resources.) In addition, no significant long term direct physical effect on water supply systems is expected. The main objective of any mitigative measures should be the preservation of the hydrologic regime of Burrs Brook.

In the area of indirect negative impacts on future water supply, the actual magnitude is indeterminate. While it is generally held that intensive development will degrade long term water quality, the present reservoir diversion system has shown resiliency in the face of current development and known wastewater disposal problems. The project was assigned a moderate impact rating because it does encourage limited development in a small portion of the watershed. The magnitude of this potential area of impact can be minimized through the continued monitoring of all land uses within the watershed both for point and non-point pollutants.

In the area of indirect impacts on existing habitat, the basis of the impact was the limited conversion of farmland and undeveloped land along Route 80 which presently provides habitat for common small animals.

### 5.911 Impacts Which Cannot be Avoided

Certain impacts on the environment are inevitably a sociated with the construction of this project. Temporary traffic detours and delays, noise, and dust generation are likely, but only short term, phenomena that will be experienced in the local neighborhoods when the street sewers are constructed. Where the sewers are built off streets, through some yards, a temporary disruption will also occur.

In the intervening open spaces, some potential for short and long term impacts on the wetlands remains. Most of these impacts can be minimized or eliminated by the mitigative measures described in the next section.

### 5.912 Mitigative Measures

The direct wetland impacts consist of short term construction impacts and potential long term impacts due to environmental design considerations.

Most construction impacts have been addressed in the general specifications of the Town's design for the Foxon interceptor. Erosion and related water quality impacts are covered by general State standards for construction which require steps to avoid sedimentation and restore vegetation. Actual monitoring of construction activity will be necessary to insure that the general guidelines are followed out. Also, the unnecessary cutting of trees along the stream bank should be avoided.

Many long term potential impacts have already been addressed in the existing interceptor design. Cast iron construction throughout will minimize long term risk of accidental contamination of water quality. Concrete encasement of the pipe and lateral sewers at stream crossings will further minimize exfiltration risks. To further reduce the long term impacts in the wetlands area, steps should be taken to preserve the existing hydrologic regime. Original grades should be maintained so as not to interfere with natural drainage patterns. In addition, due to the porous nature of the gravel trench bed, which could potentially intercept the brook's base flow, provision should be made to include impermeable clay barriers at points along the interceptor trench.

## 5.92 Green Acres Area

The final determination of the choice of a project for this problem area will be made on the basis of cost and feasibility. Because of the limited size of this sub-division, and the surrounding drainage area, no significant environmental impacts were identified (Figure 5-1). Minor negative impacts were assigned in the areas of wetlands and existing habitat for the construction of both the Conventional Sewer System and the Pressure Sewer System when they cross open land.

The major concern in this problem area is cost, both total and individual. EPA must first demonstrate that they have selected the most cost effective solution before they can fund the project. Because on-site rehabilitation could not be ruled-out as infeasible due to large lot size, it cannot be demonstrated that either sewer system is cost effective. This is due basically to the large differences in cost between on-site or either sewer system (Appendix C).

The individual cost estimates were also unusually high. It should be remembered that lateral funding, which has made present sewering relatively inexpensive, is not available at this time. In addition, the larger local cost would be shared by fewer people in this area due to large lot size. In an effort to determine the effect on individual costs of differing sewer system configurations, the analysis was performed for the Green Acres area both with and without the inclusion of Surrey Drive. The costs are shown in Table 5-3.

## TABLE 5-3

## COST ESTIMATES FOR GREEN ACRES SEWERS

| | Total Project Cost | First Year User | Every Year User | Tax Increase |
|---|---|---|---|---|
| Green Acres and Surrey Conventional Sewer | $641,875.00 | $832.00 | $232.00 | 0.30 |
| Green Acres Conventional Sewer | 430,000.00 | 907.00 | 307.00 | 0.59 |
| Green Acres and Surrey Pressure Sewer | 390,780.00 | 753.00 | 153.00 | 0.08 |
| Green Acres Pressure Sewer | 283,205.00 | 754.00 | 154.00 | 0.06 |

Source: Anderson-Nichols & Company, Inc., 1979

In Green Acres, it is recommended that the Town re-examine the feasibility of on-site rehabilitation in light of the high cost of sewering. In today's atmosphere, such an approach may well receive funding that was not generally available in the past.

#### 5.921 Impacts That Cannot Be Avoided

Both sewer systems would have the potential for impacts on wetlands. In the case of the conventional sewer system, these impacts would be in wetlands with some habitat potential along Eight Mile Brook. In the case of the pressure sewer, most sewers would be along streets with the exception of a length which traverses the undeveloped portion on the eastern edge of Green Acres along Valley Road. This area is basically barren as the result of gravel removal, but is technically a wetland.

#### 5.922 Mitigating Measures

In the case of the conventional sewer system, measures similar to these in the Foxon area should be taken to insure the short and long term integrity of the wetlands through design specifications.

### 5.93 White Hollow Area

Two alternatives were examined which might provide an answer for this area's wastewater problems. Both the on-site rehabilitation and community sewer system were thought to be feasible after a preliminary analysis. On-site rehabilitation would be the least expensive if further engineering studies were able to develop the site specific information that would be needed to support a Town sponsored application for Federal and State grants.

The community sewer system was examined to the extent that suitable areas for a leachfield were found in down gradient locations to receive gravity flow of the effluent of individual septic systems in the area. Costs for a small diameter gravity sewer were developed and are shown in Table 5-4.

## TABLE 5-4

## COST ESTIMATES FOR WHITE HOLLOW COMMUNITY SEWER

| Total Cost | First Year User | Every Year User | Tax Increase |
|---|---|---|---|
| $1,563,600.00 | $913.00 | $313.00 | .68 |

Source: Anderson-Nichols & Company, Inc., 1979

The on-site rehabilitation approach would have no negative impacts. The community sewer system would appear to have several negative, though not significant, impacts. It would seem that design of a gravity system would necessitate stream and wetland crossings which would have potential impacts. In addition, in depth hydro-geologic investigations would be necessary to determine the actual feasibility of the leachfield sites. Because of the unknown fate of the leachfield effluent in close proximity to the Northford diversion, this alternative was assigned a negative impact.

### 5.931 Impacts That Cannot Be Avoided

The wetland impacts that have been cited earlier could occur. Some temporary disruption of existing habitat would be likely in the wetland areas adjacent to the Farm River.

In the absence of any detailed knowledge of the potential leachfield sites, it would appear likely that some small increase in nitrates in the ground and surface water would occur. A detailed hydro-geologic investigation would be necessary to determine actual concentrations.

### 5.932 Mitigating Measures

The wetland impacts could be minimized by incorporating protective measures into the engineering design and specifications when this detailed work is done.

It might also be necessary to monitor ground and surface water in the vicinity of the leachfield in order to determine the actual fate of nutrients in the soil.

### 5.94 Areawide

In the areas of North Branford for which no specific approach to wastewater management is suggested, some general guidelines apply. In limited problem areas such as the Miller/Grant Road neighborhood, an evaluation of on-site rehabilitation should be pursued as part of a Step I Facility Plan. Such an area might be included in the concept of an official Town on-site management program. In the absence of any Town sponsored plan, residents would have to rehabilitate their septic systems as problems arose.

For all parts of Town which remain with on-site treatment, a positive management strategy should include septage handling as a factor. Presently, private haulers dispose of pumped septage at existing wastewater treatment facilities at Branford or North Haven. Since many areas of Town will remain on spetic system use for the forseeable future, the regular pumping of septic systems should be maintained through periodic reminders to residents. In addition, the activities of pumpers should be monitored to insure that the waste that is pumped is properly disposed of. The details of a septage management plan should be worked out as part of the anticipated additional 201 engineering plan for the remaining problem areas at North Branford. The outcome of that work would specify the future course of action to be taken in large areas of the community and would commit the Town to a final area wide plan.

# SECTION 6

# LIST OF PREPARERS

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This chapter provides information on the professional qualifications of those responsible for the preparation of this EIS

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## 6.1 Responsible Agency and Technical Consultants

Region I of EPA was responsible for preparing this Draft EIS.

Technical assistance to EPA was provided under a contract with Anderson-Nichols of Boston. Anderson-Nichols is a multi-disciplined firm of planners, environmental specialists, engineers and architects.

Anderson-Nichols utilized the services of one subcontractor. Dr. Charlotte Thomson of Newbury, Massachusetts conducted the archaeologic investigations for the proposed Foxon interceptor.

## 6.2 Region I - EPA Staff

### 6.21 Project Officer

Mr. Robert Mendoza had overall responsibility for the preparation of this DEIS. He is a professional planner with an MRP degree from Pratt Institute. Mr. Mendoza supervises the preparation of all wastewater EIS's in Region I.

### 6.22 Project Manager

Mr. Kenneth Wood is an experienced environmentalist with a number of years in the environmental and horticultural field. Prior to joining EPA, he was with the Massachusetts Division of Water Resources and was Executive Director of the Charles River Watershed Association. Mr. Wood was in charge of the day to day coordination and supervision of all technical work.

### 6.23 Municipal Facilities Branch Staff

Mr. Chester Janowski is a professional engineer responsible for coordinating various wastewater projects in Connecticut being funded by EPA. He holds a BS degree in Civil Engineering from Lowell Technological Institute.

### 6.24 Water Quality Branch Staff

Mr. William Nuzzo coordinated the water quality review on this EIS. He holds a BS degree in Civil Engineering from Clarkson.

## 6.3 Anderson-Nichols

### 6.31 Project Manager

Walter Murphy was Project Manager for the North Branford coordinating activities within Anderson-Nichols and with EPA. He has an MS degree in physical geography and is at candidate stage in the Ph.D program at Clark University in Environmental Management.

### 6.32 Project Coordinator

Burk Ketcham, Director of the firm's Planning Division, was responsible for overseeing the project and for reviewing the EIS. Mr. Ketcham is a professional planner with a Masters Degree from Columbia University.

### 6.33 Project Engineer

Joe Zeneski is a professional engineer specializing in wastewater projects. He was responsible for major items of an engineering nature including the needs survey, the development of alternatives and the cost effective analysis. He holds a Masters Degree in Environmental Engineering from the University of Rhode Island.

### 6.34 Environmental Planner

Janet Burns assisted the Project Manager in developing the environmental inventory and in conducting the public participation program. She has an MS degree from the Harvard School of Design.

## 6.4 Sub-Contractors to Anderson-Nichols

### 6.41 Dr. Charlotte Thomson

Dr. Thomson is an experienced archaeologist with advanced degrees from Harvard University. She has carried out numerous archaeologic investigations on wastewater projects.

### 6.42 Environmental Analysis Laboratory

The design of the water quality sampling program, sampling, and analysis were conducted by EAL, an accredited laboratory using EPA methods.

# APPENDIX A

# PUBLIC PARTICIPATION

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This section of the report summarizes the efforts of the EIS team to involve the local North Branford community in the decision making process.

## TABLE OF CONTENTS

| | | PAGE |
|---|---|---|
| A.1 | Public Participation Program........... | A-1 |
| A.2 | Newsletters............................ | A-1 |
| A.3 | Newspapers............................. | A-1 |
| A.4 | Workshops.............................. | A-2 |
| A.5 | North Branford Septic System Questionnaire......................... | A-15 |
| EXHIBIT A-1 | Newsletter #1 | A-3 |
| EXHIBIT A-2 | Newsletter #2 | A-7 |
| EXHIBIT A-3 | Newsletter #3 | A-11 |
| EXHIBIT A-4 | North Branford Citizen's Questionnaire | A-16 |

## A.1 Public Participation Program

In order to insure that the EIS process validly reflected the needs and desires of the local community, an effort was made throughout the project to involve the public. At the start of the project, an introductory meeting was held for all Town Boards and Officials to describe the objectives and various work elements of the project. Subsequent meetings were held with the Sewer Authority/Town Council and with the Planning Board.

The general public and interested citizens were kept informed and involved in the process through news releases, mailed newsletters, and a series of workshops. Input on local experience also was acquired by means of a questionnaire. These elements of the project were briefly described in Section 1.0 and are described in greater detail in the sections that follow.

## A.2 Newsletters

Three newsletters were mailed to 3,700 households in North Branford during the course of the study. Basically, the newsletters served three purposes:

- keep citizens informed of project status
- report interim findings
- announce workshops

Copies of the newsletters are included on the pages that follow.

## A.3 Newspapers

The New Haven Register was monitored for the period of the EIS in order to keep informed on local events. Items of particular interest included the local referendum that was held to decide the course of action the Town will take with respect to local funding of sewers in the EPA approved C-1 area. Preceding the referendum, the paper became the forum for a public debate on the merits of the program and on the growth issue.

Public participation in the EIS process was aided by newspaper coverage based on EPA news releases prior to each workshop. Also, the paper served as an additional means of informing the public of upcoming meetings through the use of advertisements.

## A.4 Workshops

Three workshops were held in North Branford at evenly spaced intervals in the course of the project. These meetings were intended as informal sessions at which the public could be informed of the project status and findings and provided with the opportunity of direct input into the project.

The workshops were structured as follows:

-- Hand out material specifically prepared for the North Branford project was distributed at meetings.

-- A short presentation was given at the start of each workshop accompanied by the use of visual aids.

-- Workshop sessions were conducted in small discussion groups who chose leaders to deliver the oral presentation of their conclusions at the end of the meeting. When problem areas were identified, they served as the basis for forming neighborhood groups which could provide greater insight into neighborhood problems.

-- A brief questionnaire was distributed and collected from all groups or individuals if they chose to do so.

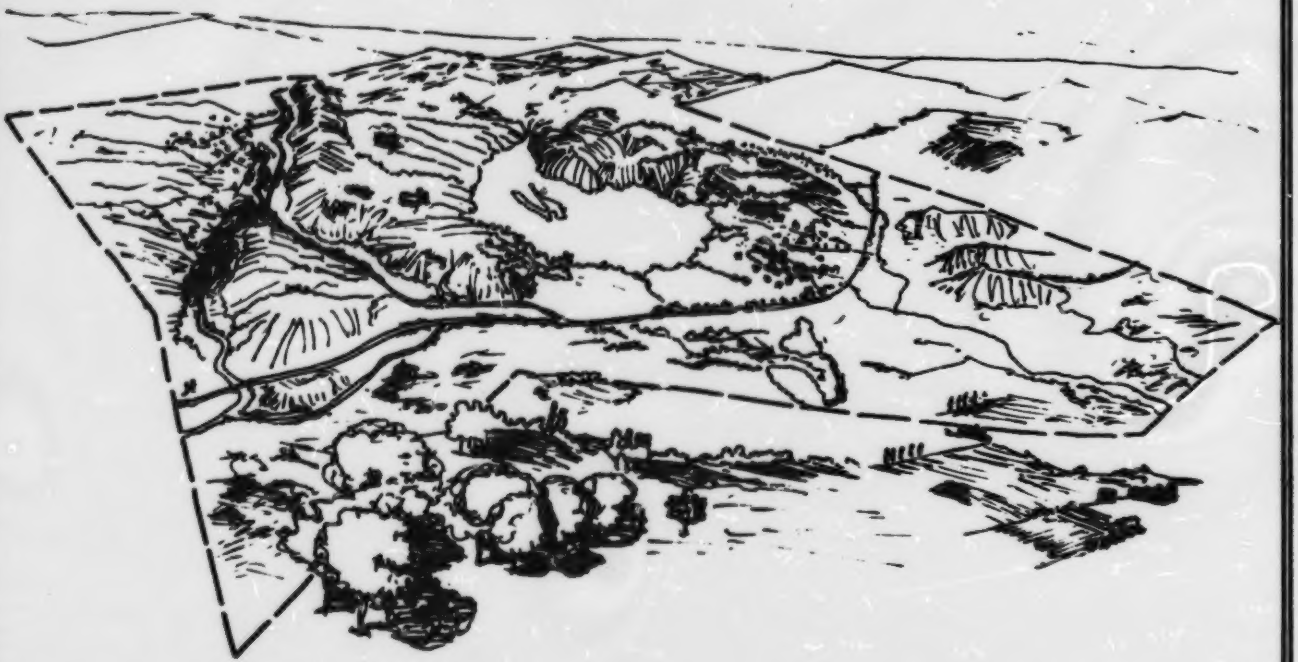
The workshops were focused on several main points. These were:

-- the tentative identification of problem areas

-- verification of the EIS problem areas

-- discussion of available alternatives

EXHIBIT A-1



january

# n. branford eis news

1

EXHIBIT A-1

# questions about environmental impact statements

*WHAT IS IT?*

- The Environmental Impact Statement, EIS, is a report which will be prepared as part of an environmental analysis of North Branford's wastewater disposal and water quality problems.
- The analysis includes a determination of the types and extent of wastewater problems, an evaluation of alternative sewer and non-sewer solutions to those problems and the selection of recommended projects.
- The information that will be used in the analysis will be the combination of previous work of local and state agencies, current public participation in the EIS process, and supplementary field data collected by the EIS project team.

*WHY IS IT BEING PREPARED?*

- The Federal Environmental Protection Agency, EPA, must review proposed local wastewater management projects where there is the potential for significant environmental impact on natural and cultural resources in a town or region.
- EPA was petitioned by North Branford's residents and agencies, as well as State agencies, to review the proposed local project.

*WHO WILL PREPARE IT?*

- EPA, Region 1, Boston, has engaged Anderson-Nichols & Co., Inc. 150 Causeway Street, Boston, to assist in the preparation of the EIS.
- The project team will consist of planners, hydrologists, sanitary engineers, and other specialists.
- Local residents, through workshops, questionnaires, correspondence, and a public hearing will play an important part in shaping the form and content of the Final EIS.

*WHEN WILL IT BE PREPARED?*

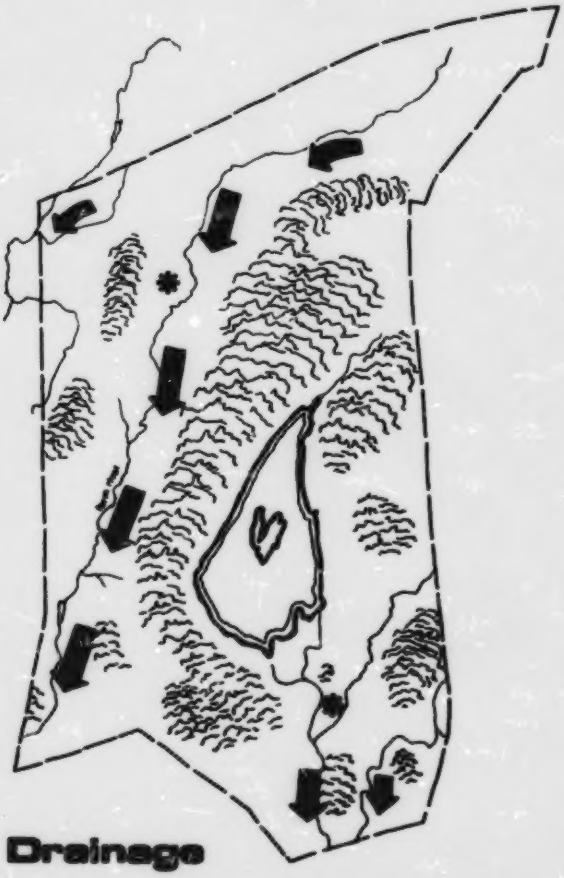
- The EIS process was begun about 1 December 1977 and is expected to take about one year before the Final EIS is published.
- Local meetings and press releases will keep residents informed at regular intervals.
- A Draft EIS will be published in the spring.
- A review period with local meetings and a public hearing will be held before the Final EIS is published in the fall.

EXHIBIT A-1

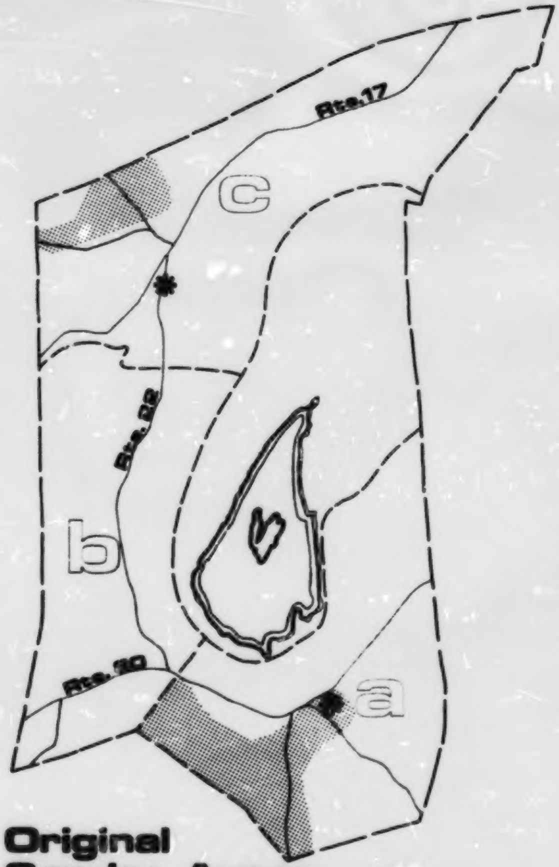
## scope of study

The original sewer project developed by the Town of North Branford and its engineering consultants, was designed to eventually serve almost the whole Town. Areas A, B, and C, as shown in the figure, would have been sewered in three phases. EPA has approved grants for the construction of the initial sewering in Areas A and C only (shaded areas). The EIS will evaluate the existing and potential water quality and wastewater disposal problems in the portions of Areas A, B, and C that have yet to be approved for funding.

The purpose of the EIS will be to bring together all available information, to permit a reevaluation of the nature and extent of the water quality and wastewater disposal problems in North Branford and identify the alternative feasible solutions. The benefits and limitations, including short- and long-term costs will be identified.



**Drainage**



**Original Service Areas**

## environmental issues

EPA's review of the original project identified some of the areas which the EIS will address. One important issue is the water quality of the Farm River which is used for water supply by the New Haven Water Company. Much of the eventual sewering that was proposed for Areas B and C would fall within the Farm River Basin. The effect of development that might accompany the sewering on water quality, land use, and natural systems will be evaluated. Other areas of impacts that have been identified for study include the relationship of sewering and Town planning and the general rural character of the community. As the study progresses, additional issues may develop.

EXHIBIT A-1

## workshop 1

As part of the general EIS process shown at the right, several Workshops will be conducted in North Branford. The purpose of this Workshop will be to introduce the townspeople to the EIS process and to obtain local input concerning water quality and waste disposal problems within North Branford. Both the general public and local spokespeople are encouraged to participate.

The format of the first Workshop will be semi-structured with randomly selected groups of about six people working at individual tables in an effort to develop a consensus as to the nature and extent of problems in the area. During a short informal session of round-table discussions, maps will be available to assist the groups in identifying areas (not specific isolated houses) where problems are known to exist. Through the development of several key questions, brief oral group reports are used to relay the findings of the individual tables to the group as a whole. After the group reports, a general discussion is encouraged.

As a result of this effort, EPA hopes to obtain firsthand information on the types of problems that occur or are likely to occur, solutions that may be most appropriate and a general sense of the concerns of the community. The intent is to explore the whole issue of local water quality/waste disposal problems and their possible solution. The more information that we are able to obtain from the people familiar with local problems, the better our recommendations for wastewater management will be.

THE FIRST WORKSHOP IS SCHEDULED TO BE HELD AT THE TOWN HALL ON ROUTE 80 ON MONDAY, 16 JANUARY 1978 AT 7:30 P.M.

## general eis process

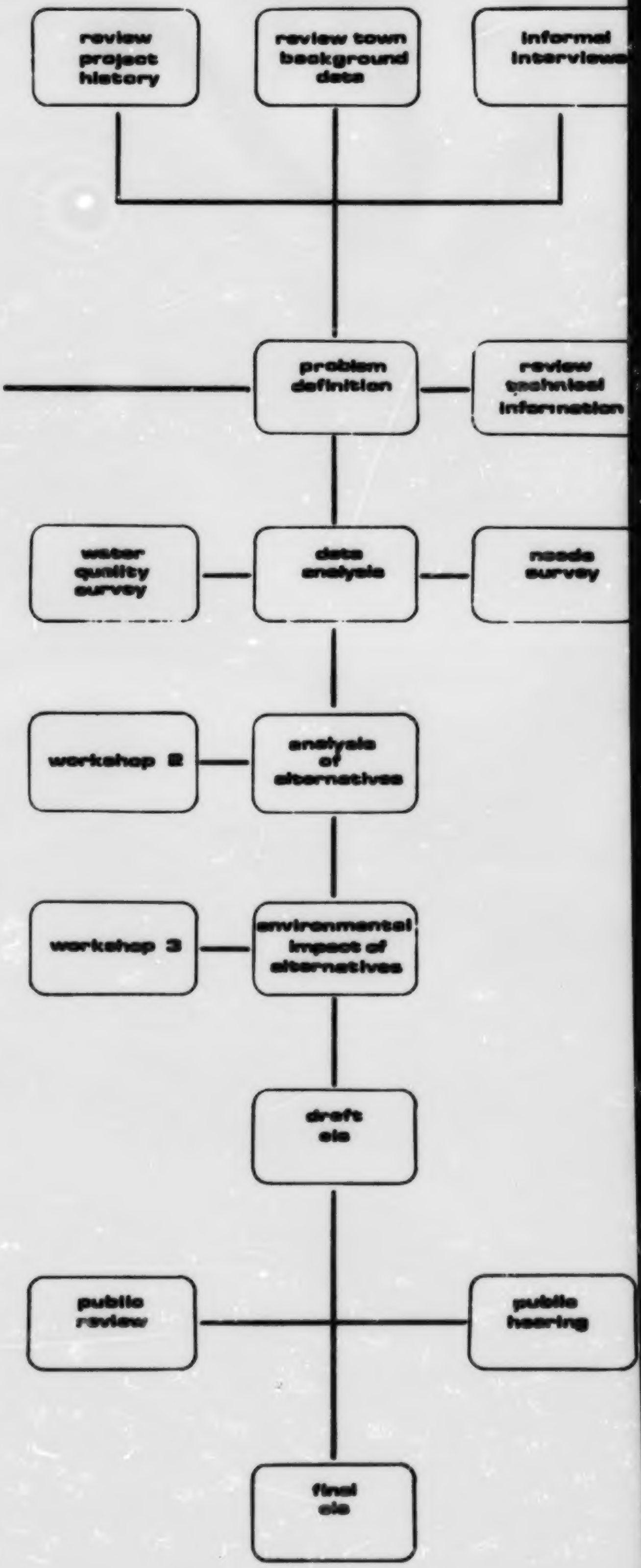
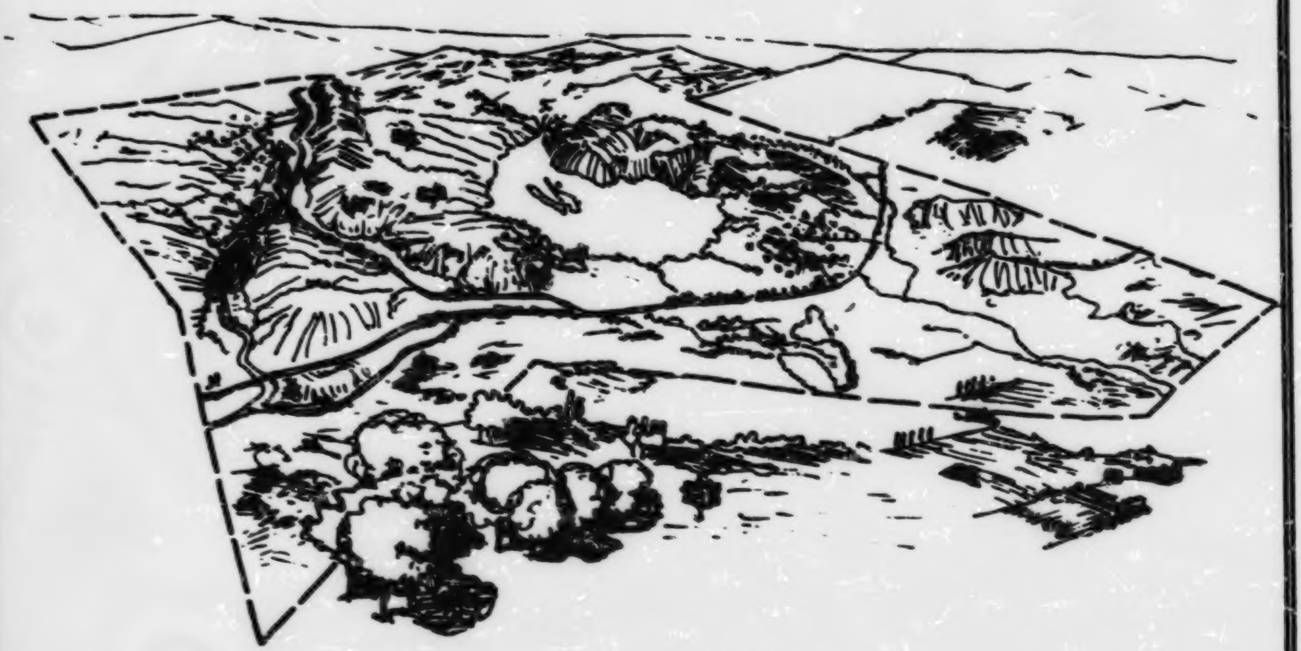

review project history
review town background data
informal interviews
problem definition
review technical information
water quality survey
data analysis
needs survey
workshop 2
analysis of alternatives
workshop 3
environmental impact of alternatives
draft eis
public review
public hearing
final eis

EXHIBIT A-2



may

# n. branford eis news

2

EXHIBIT A-2

# WHAT'S BEEN HAPPENING? SEE BELOW *

## * WORKSHOP No. 1 RESULTS

In January about 25 residents participated in the first of three workshops. The basic purpose of this meeting was to give local people the opportunity to input their own experiences into the EIS process. The participants were specifically asked to discuss among themselves where they felt there were septic system problems. Later in their reports to the group, a number of areas were consistently mentioned. These areas included Green Acres, White Hollow and Arthur Road. Some groups offered their views as to how the problems might be solved. One group argued for the construction of sewers while the other felt that a scaled-down solution would be more appropriate. The results of the workshop were incorporated into the design of the subsequent field work. Now that the project has moved further toward defining the scope of local wastewater disposal problems, it is hoped that more citizens will participate in the upcoming workshop as the EIS moves toward the consideration of solutions to these problems.

## * QUESTIONNAIRE

In early February, the EIS Questionnaire was distributed to every household in the EIS study area. To overcome problems that may have been caused by bad weather, the response period was extended and additional questionnaires were made available through a local telephone number.

On the whole the questionnaire return of about 20% will serve as another useful indication of local experience and opinion. A rough hand count of two pertinent questions showed the following overall response:

- *Do you feel that your septic system is a problem?*
  *Yes, 25%; No, 75%*

- *Do you feel that your neighbor's system is a problem?*
  *Yes, 42%; No, 46%; Don't know,* 12%

EXHIBIT A-2

The questionnaires responses reinforced the earlier identification of Green Acres, White Hollow, and Arthur Court as problem areas. As a result of the questionnaire, Jerz Lane, Surrey Drive, and Brook Lane were also included for further study.

The entire questionnaire will be tabulated for the second workshop. In addition to the two limited questions listed above, there is a wealth of information regarding the present use of septic systems and the public's opinion and attitudes toward the local problem. The final analysis will serve as a very valuable source of how North Branford residents feel about the wastewater disposal problem and its possible solutions.

## * NEW DEVELOPMENTS

Under new EPA regulations and guidelines the process of evaluating solutions to wastewater disposal problems has been expanded. New requirements will apply to any pending or future Federal grant. While the requirements are now more rigorous in terms of demonstrating the need for a project, they also provide for a much broader range of solutions that may be eligible for funding. Grants may now be made available for solutions ranging from centralized sewer collection systems to town-managed septic systems on individual lots. All of these alternatives must be given serious consideration in order that the most cost-effective, environmentally sound project be developed. In addition, certain types of solutions such as land treatment systems may be grant eligible even when they are slightly more expensive. In brief, the new regulations should result in projects that can be demonstrated to be the best solution to a local problem. The relationship of these new guidelines to North Branford will be discussed at the second workshop.

## * FIELD EFFORT

During early May a number of engineering efforts were conducted in North Branford which will help in two ways. First, a check of neighborhoods with potential problems will help to determine if the reported problem is actually a neighborhood problem or just a single house. This evaluation will be assisted by sanitary surveys conducted in the area concurrently by Connecticut Department of Environmental Protection personnel. Secondly, the EIS engineering team looked at the limitations and potentials of neighborhood areas for present disposal methods and for possible future solutions. The findings of the field work will be reported at the workshop. Also, the range of general solutions which may be feasible on a neighborhood basis will also be discussed.

## * WATER QUALITY SAMPLING

Since mid-March, EIS laboratory personnel have been collecting samples from local streams in an effort to determine the exact condition of local water. The effort was directed both toward the detection of possible effects of reported septic system problems and toward establishing a data base against which we can measure future environmental impact. Samples have been collected at 14 locations on 4 different occassions. The preliminary results of this program will be discussed at the upcoming workshop.

# EXHIBIT A-2

## ✱ WORKSHOP No. 2

This workshop is being held for two reasons - to tell residents what we have been doing - to receive your comments and suggestions concerning the on-going EIS work. The tentative agenda for the meeting follows:

| | |
|---|---|
| 7:30 | Project Status |
| 7:40 | Questionnaire Results |
| 7:50 | Water Quality Sampling Program |
| 8:00 | Engineering Field Effort |
| 8:10 | Discussion of Range of Alternatives Available to Communities |
| 8:30 | Group Discussion<br>Discussion of neighborhood problems and possible solutions by residents |
| 9:15 | General Discussion of Group Reports |
| 10:00 | Informal Exchange of Information (EPA will be available to answer specific questions for individuals who wish to remain) |

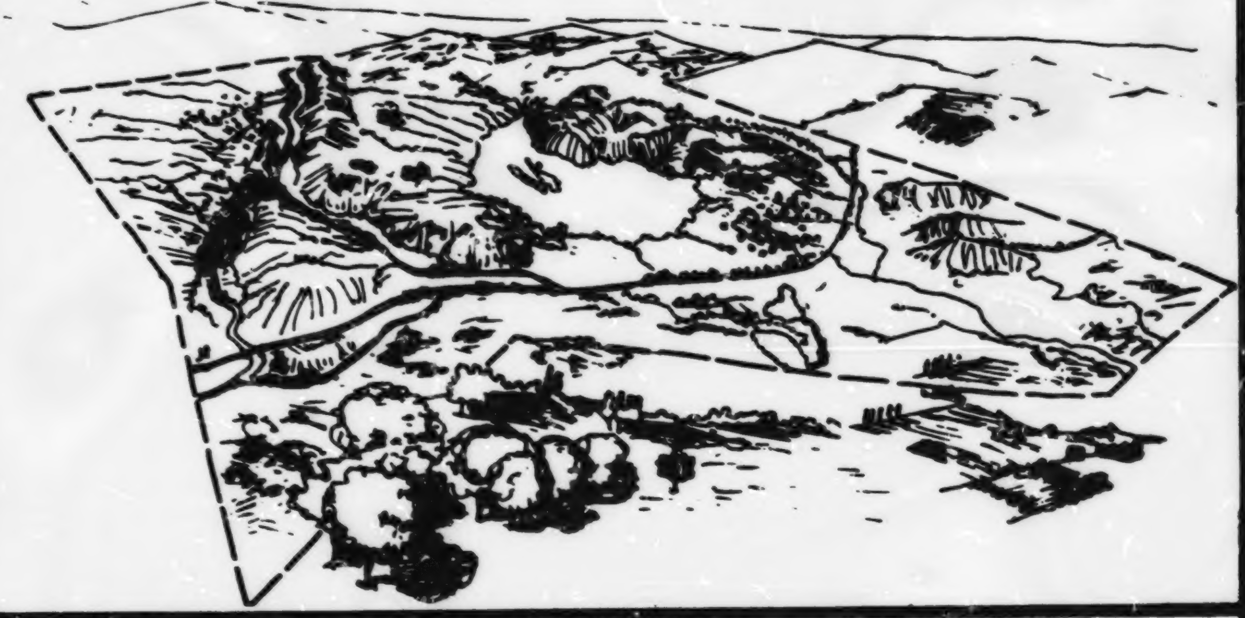
The short presentation at the beginning will be supplemented with graphic materials where appropriate. Technical information including generalized cost will also be presented to the extent that they are known at this time. Informational handouts also will be available.

**TIME & PLACE: INTERMEDIATE SCHOOL CAFETERIA**
**7:30 P.M. THURSDAY, MAY 25, 1978**

JOIN US !

EXHIBIT A-3

# WHAT IS THE ANSWER ?



AUGUST

# n. branford eis news 3

## EXHIBIT A-3

### WHAT IS THE QUESTION?

The big question is: *what kind* of project should EPA commit Federal money to for the solution of water quality problems in North Branford. *How bad* are the conditions? *Where* are the septic systems that don't work? *How much* water pollution is there? *What* is the best solution? For *you?* For the *Town?* For the *State* and *Federal Governments? How much* will it cost? Will the cure be *worse* than the problem? All things being equal, what do local residents *want* to do?

### HERE IS SOME BACKGROUND......

Some people in Town feel that the whole sewer project will *solve* problems, not create them. Others feel that the whole town will not need sewers, that sewers cost a lot of money and will change the character of the Town. By taking a second look, with new faces, the EIS will at least pause for viewpoints to be expressed, new information collected, and an independent decision to be made. Also, there may be some new choices for the Town. The EIS study has been going on for about six months, data has been collected, meetings have been held, opinions have been sought and a Draft Impact Statement is being prepared. This report will spell out all that EPA has learned about the problem, *but more information from you will be welcomed!*

### IN WHAT DIRECTION IS THE EIS HEADED?

The EIS process has defined a number of "problem areas" in North Branford: the general areas of White Hollow, Green Acres, Jerz Lane, Dorrie Lane and Arthur Court. The EIS process has selected three alternative methods for solving wastewater disposal problems. These alternatives will be evaluated for each of the problem areas. Also, when evaluating alternatives that may apply in a certain problem area, neighboring areas that may have problems in the future will be considered. The alternatives under consideration are *large scale sewering, localized sewering,* and *septic system rehabilitation*.

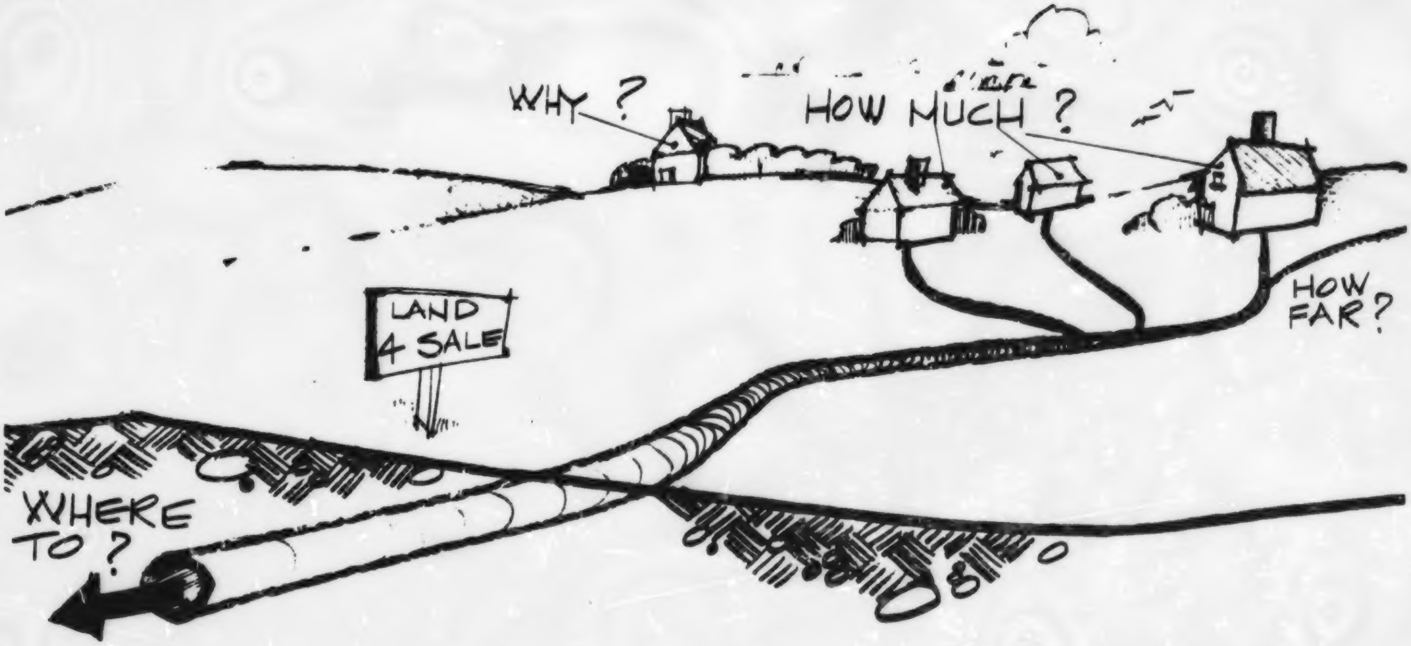
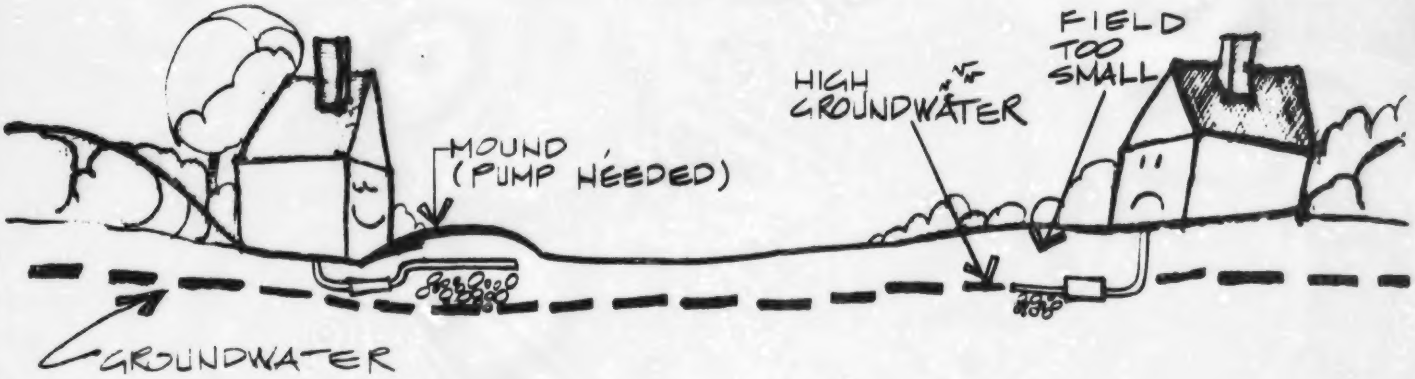

WHY ?
HOW MUCH ?
LAND 4 SALE
HOW FAR ?
WHERE TO ?

EXHIBIT A-3



The LARGE SCALE SEWERING ALTERNATIVE that will be evaluated will be basically the concept that has been developed by the Town. While only certain portions have been proposed for immediate construction, such as the Foxon Road area, they have been designed assuming future expansion into most areas of Town. A centralized sewer system connecting to nearby towns has several advantages:

- The homeowner's problems are permanently solved.
- The Town does not have to manage a treatment facility.
- Local extensions are possible in the future.

There are a number of questions related to this alternative.

- What are the real costs of sewers compared to the immediate problem?
- What will be the long term effects on the character of the Town?

This alternative is being seriously evaluated for the Foxon Road area. It is also being considered as a solution for Green Acres in the near future. Elsewhere this alternative will be evaluated as a long term solution to scattered problem areas.

The LOCAL SEWERING ALTERNATIVE consists of providing sewers for problem neighborhoods but treating and disposing of the wastewater locally. Local treatment in North Branford would likely consist of discharge to the ground. In a small neighborhood the method might simply be a large septic system. The advantages of this alternative would include:

- Possible lower total costs due to smaller sewer system.
- Homeowners have present problems permanently solved.
- Possible secondary effects of sewers reduced.

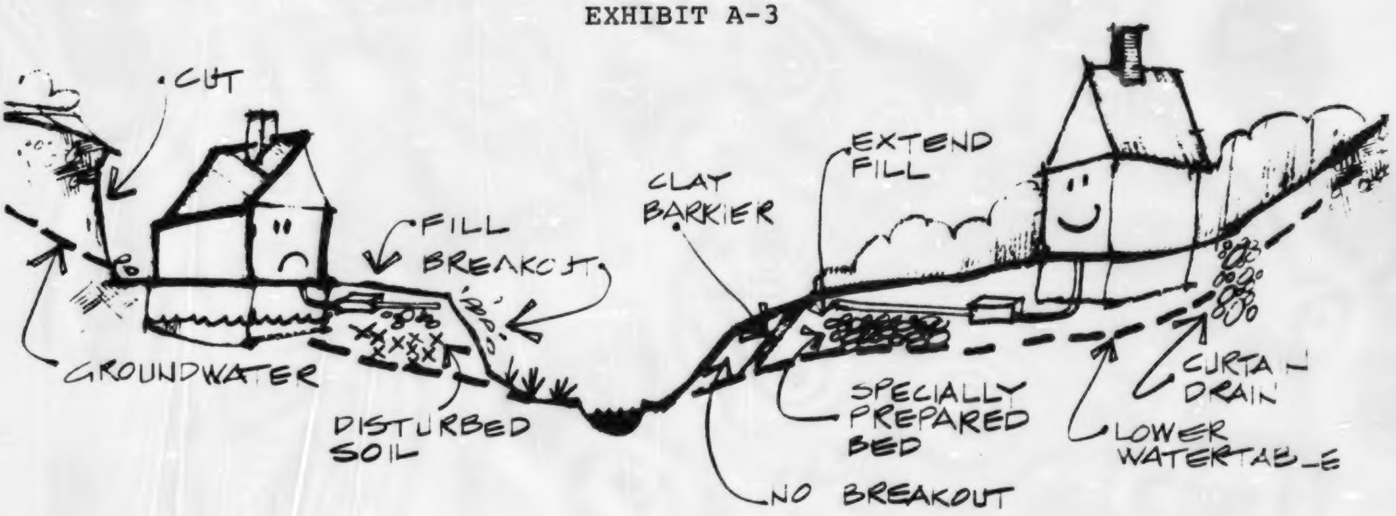
Some issues associated with this approach include:

- Suitable sites for land disposal systems must be found.
- Who pays for the limited system?
- Future expansion may be difficult or impossible.

Although a previous Town study examined this type of solution for the Foxon area, no evaluation of this type has been done elsewhere.

This alternative is being seriously considered in the White Hollow, Miller Road, and Jerz Lane areas. It may also be possible in the Foxon Road area depending upon costs and need.

EXHIBIT A-3


CUT
GROUNDWATER
FILL BREAKOUT
DISTURBED SOIL
CLAY BARRIER
EXTEND FILL
SPECIALLY PREPARED BED
NO BREAKOUT
LOWER WATERTABLE
CURTAIN DRAIN

The REHABILITATION ALTERNATIVE is more feasible under recent changes in Federal law which have now made this eligible for grants under certain conditions. In some places the physical short-comings of the site can be reduced by rebuilding the system with newer designs or by improving drainage. Advantages may include:

- Lower total costs where problems are few and isolated.
- No negative development impacts.

Some problems that might arise include:

- Town must maintain systems.
- Future problems are not directly addressed.
- Uncertainty about long term solution.

The application of this type of solution is largely untried. Many questions concerning the use of Federal and State money for this alternative remain.

This alternative is being seriously considered for the White Hollow, Green Acres, Surrey Drive, Jerz Lane, Dorrie Lane, and Miller Road areas.

All three alternatives and their implications for your neighborhood will be discussed at the next workshop.

JOIN US AT WORKSHOP No. 3 ON
WEDNESDAY, AUGUST 16, AT
THE STANLEY T. WILLAM'S
ELEMENTARY SCHOOL
AT 7:30 PM

The input that was received was incorporated into the record at the project through a summary memo.

## A.5 North Branford Septic System Questionnaire

The questionnaire was mailed to all households in early February. A pre-addressed postpaid form was used to facilitate ease of return. Originally, provision was made for a local telephone number to be available to which residents might direct any questions that they might have about the form or its intent. The state of emergency that occurred due to the blizzard in early February pre-empted the use of the phone for emergency calls only. Nonetheless, a respectable return of about 18% was obtained. A copy of the questionnaire follows. Some of the questionnaire results are reported in Appendix D.

EXHIBIT A-4

# u.s. environmental protection agency north branford citizens' questionnaire

The purpose of the enclosed questionnaire is to collect up-to-date information on the operation and maintenance of septic systems in the Town of North Branford as part of the year-long effort required to prepare the North Branford EIS. For simplicity and economy, this questionnaire is being distributed to each mailing address in town. Unavoidably, this questionnaire will be received by homeowners who are in the proposed sewer service areas: Section A and Section C. Therefore, for your convenience, the following list of streets to be sewered in the approved areas is included. If you live within the approved sewer service area, it is not necessary to complete and return the questionnaire.

**Section A**

Circle Drive
Harrison Road
Lea Road
Frederick Street
Loeber Place
Notch Hill Road (from Loeber Place to Frederick Street)
Branford Road (from Twin Lake Road to Branford Town Line)
Chidsey Drive
Burr Hill Road
Hubbard Road
Meadow Road
Lake Road
Queach Road (Northford Road)
Twin Lake Road
Cedar Lake Road
Glen Circle
Glen Road
DeForest Drive
Brook Road
Rivaldi Drive
Colonial Drive
Ric Court
Summit Drive
Holly Heights Drive (partially)

**Section C**

Birchwood Drive
Carlen Drive
Cedar Lane
Clintonville Road (from Birchwood Road to North Haven Town Line)
Conifer Drive
Glen Meadow Drive
Village Street (from Clintonville Road to Woodvale Drive)
Woodhouse Avenue
Woodvale Drive

EXHIBIT A-4

## DIRECTIONS

It is requested that you fill out the questionnaire as completely as possible, whether you have a wastewater disposal system problem or not, within seven (7) days. The more complete and detailed the information is from this questionnaire, the better and more specific will be EPA's recommendations. When you have completed the questionnaire, simply refold, CROSS OUT THE WORDS "POSTAL PATRON" AND DEPOSIT IN MAILBOX.

If you have any questions concerning this questionnaire, you can contact a representative of Anderson-Nichols and Company, Inc., EPA's EIS Consultant at 488-8353 Ext. 19 or 24 between 1 p.m. and 9 p.m. on Monday, 6 February and Tuesday, 7 February.

## GENERAL

- **Building Location:**

  **Street and Number**____________________ **Neighborhood**________________________

  **Building age**__________________ **Lot Size**________________________________

  **Do you: own ☐ rent ☐**

- **How long have you owned or rented this building?**______________________________
- **If house, number of people occupying the building**_____________ **their ages**________
- **Water Supply: Water Company ☐ Private Well ☐**
- **Type of Wastewater disposal system:**

  **Septic tank system ☐ Cesspool ☐**

  **Separate washing machine discharge ☐ Other (specify)**________________

- **Wastewater disposal system age** ____________________ **(years)**
- **Appliances used:**

  **Dishwasher ☐ Washing Machine ☐**

  **Garbage disposal ☐ Sump pump ☐**

- **Have you ever noticed any of the following wastewater disposal system trouble signs:**

  **Wet spots ☐ Dark green grass over the system ☐**

  **Odors ☐ Melting snow over the system ☐**

  **Slow drains ☐ None of the above ☐**

- **Is your lot subject to flooding during rain?-------------------------Yes ☐ No ☐**
- **Have you ever had your wastewater system repaired or modified?--------Yes ☐ No ☐**
- **If yes: What was done and when was it done**___________________________________

  **Has the repair or modification solved your problem?------------------Yes ☐ No ☐**

# EXHIBIT A-4

## SYSTEM MAINTENANCE

- What do you do to prevent problems?

  Conserve Water--------------------------------------------------Yes ☐ No ☐

  Keep grease out of drain:----------------------------------------Yes ☐ No ☐

  Use chemical additives:------------------------------------------Yes ☐ No ☐

  If yes:

  Which additives?______________________________

  How often?__________________________________

  Do you have the system pumped?-----------------------------------Yes ☐ No ☐

  How often?_______________ At what cost?__________

- Are you confident that these Actions Work------------------------------Yes ☐ No ☐

## PERSONAL OPINION

- Do you feel that your present disposal system is a problem?-----------Yes ☐ No ☐
- If yes: What do you think is the cause of your problem (explain)______________

  ______________________________________________________________

  ______________________________________________________________

  What do you think it would cost to repair or replace your disposal system so that it would be problem free?

  $0 $500 $1000 $1500 $2000 $2500 $3000 $3500 $4000 More

- If no: How long do you expect your system will continue to operate without problem?

  ______________________________________________________________

  Would you be willing to take special measures to prevent disposal system problems if you knew that they would work?------------------------------------Yes ☐ No ☐

  How much would you be willing to spend annually on these measures?

  $0 $25 $50 $75 $100 $150 $200 $250 $500 $750 More

- Do you think your neighbors are having problems with their wastewater disposal systems?-----------------------------------------------------------Yes ☐ No ☐
- Do you think that there is a water pollution problem in your neighborhood?---------------------------------------------------------Yes ☐ No ☐
- Do you feel that your water supply is of good quality?----------------Yes ☐ No ☐
- Would you be willing to have your water tested as part of this EIS?---Yes ☐ No ☐
- Do you think sewers are needed in your neighborhood?------------------Yes ☐ No ☐
- Do you think sewers are needed town-wide?-----------------------------Yes ☐ No ☐
- Do you feel that there are alternatives to sewer construction which could be used in North Branford?--------------------------------------------------Yes ☐ No ☐

  If yes, please describe:________________________________________

  ______________________________________________________________

  ______________________________________________________________

  ______________________________________________________________

# APPENDIX B

# WATER QUALITY SAMPLING PROGRAM

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B-1a

# TABLE OF CONTENTS

PAGE

B.1 Description of Sampling Program........ B-1

B.2 Explanation and Significance of Water Quality Parameters............... B-2

B.21 Total Coliform Bacteria................ B-2
B.22 Fecal Coliform Bacteria................ B-3
B.23 Fecal Streptococcus Bacteria........... B-3
B.24 Fecal Coliform/Fecal Streptococcus Bacteria Ratio......................... B-3
B.25 Surfactants (Anionic).................. B-4
B.26 Total Phosphorous...................... B-5
B.27 Nitrogen (Nitrite & Nitrate, Total Kjeldahl)........................ B-5
B.28 Biochemical Oxygen Demand ($BOD_5$) and Chemical Demand (COD).............. B-6

B.3 Sampling Sites and Field Observations........................... B-7

B.31 Site #1 - Pistapaug Pond Outlet at North Branford Road in Wallingford.................. B-7

B.32 Site #2 - Reeds Gap Road............... B-7

B.33 Site #3 - Durham Road.................. B-7

B.34 Site #4 - Northford.................... B-8

B.35 Site #5 - Above Pages Mill Pond........ B-8

B.36 Site #6 - Below Pages Mill Pond........ B-8

B.37 Site #7 - Farm River at Katherine Street....................... B-8

B.38 Site #8 - Burrs Brook at Middle School....................... B-8

B.39 Site #9 - Burrs Brook below Arthur Court........................ B-8

## TABLE OF CONTENTS (Cont'd)

PAGE

B.391 Site #10 - Burrs Brook at Totoket Road........................ B-9

B.392 Site #11 - Farm River above Northford Diversion......... B-9

B.393 Site #12 - Muddy River Drainage........ B-9

B.394 Site #13 - Eight Mile Brook at Green Acres................. B-9

B.395 Site #14 - Munger Brook above North Branford Village...... B-9

B.4 Discussion of Analytical Results....... B-10

B.41 Site # 1 - Pistapaug Pond Outlet at North Branford Road in Wallingford................. B-10

B.42 Site # 2 - Reeds Gap Road.............. B-10

B.43 Site # 3 - Durham Road................. B-11

B.44 Site # 4 - Northford................... B-11

B.45 Site # 5 - Above Pages Mill Pond....... B-12

B.46 Site # 6 - Below Pages Mill Pond....... B-12

B.47 Site # 7 - Farm River at Katherine Street...................... B-13

B.48 Site # 8 - Burrs Brook at Middle School...................... B-13

B.49 Site # 9 - Burrs Brook below Arthur Court....................... B-14

## TABLE OF CONTENTS (Cont'd)

PAGE

B.491 Site #10 - Burrs Brook at Totoket Road........................ B-14

B.492 Site #11 - Farm River above Northford Diversion......... B-14

B.493 Site #12 - Muddy River Drainage........ B-15

B.494 Site #13 - Eight Mile Brook at Green Acres................. B-16

B.495 Site #14 - Munger Brook above North Branford Village...... B-16

B.496 Water Quality Data..................... B-17

TABLE B-1 Total Coliform (MF) Data B-18

TABLE B-2 Fecal Coliform (MF) Data B-19

TABLE B-3 Fecal Streptococcus (MF) Data B-20

TABLE B-4 Fecal Coliform/Fecal Streptococcus Ratios B-21

TABLE B-5 Total Kjeldahl Nitrogen B-22

TABLE B-6 Nitrite - Nitrate Data B-23

TABLE B-7 Total Phosphate Data B-24

TABLE B-8 $BOD_5$ & COD Data B-25

TABLE B-9 Surfactant Data B-26

## B.1 Description of Sampling Program

The North Branford water quality sampling program consisted of taking grab samples at fourteen (14) surface water streams or river sites throughout the North Branford area on four (4) separate dates during the spring of 1978.

All samples were analyzed for the following parameters:

- -- Total Coliform
- -- Fecal Coliform and Fecal Streptococcus Bacteria
- -- Nitrite and Nitrate
- -- Total Phosphorous
- -- Total Kjeldahl Nitrogen
- -- Surfactants
- -- Biochemical Oxygen Demand ($BOD_5$)
- -- Chemical Oxygen Demand (COD)

The sites were established with the intent of assessing the impact of current methods of human waste disposal on local water quality and locating potential health problems. The program was not intended to be a detailed investigation of the state of water quality in the Town or to assess the impact of all human activities (i.e., other non-point pollution sources). Parameters were selected that would most likely indicate the presence of human wastes.

These sites were located either within or downstream from potentially failing on-lot waste disposal system areas, or at sites corresponding to previously sampled points on the Farm River and its tributaries by the U.S. Geological Survey. During 1975 to 1976, the USGS sampled at 13 locations on the Farm River and its tributaries. Approximately ten samples were collected at various months throughout the year, thereby reflecting possible seasonal variation. Of the 13 locations, about half were in areas which the EIS wished to obtain information. This provided an opportunity to compare data sets and thereby reduce the possibility of sampling errors. Those USGS sampling sites coincident with those of the EIS program are indicated in the description of sample sites that follows. The complete USGS data set can be found in the publication Water Resources Data for Connecticut, Water Years 1975 & 1976, U.S. Geological Survey Water Data Reports CT-75-1, and CT-76-1. To facilitate sampling, sites were located at or near accessible bridges and road culverts. Sampling dates were spaced at two (2) week intervals starting in mid-March, with the exception of the last run, which was approximately one (1) month after the third run.

Within the limits of time and funds allocated to the study, it was decided that a four (4) sampling run program would best account for variations in wet and dry stream conditions, normal sampling errors, normal stream composition and analytical errors. No attempt was made in the sampling program to account for seasonal variations other than considering the hypothesis that non-point source, on-lot disposal systems would tend to have the greatest impact on local water quality and highest probability of failure during high groundwater, wet spring conditions. However, this also might represent the conditions of greatest dilution of pollutants.

## B.2 Explanation and Significance of Water Quality Parameters

### B.21 Total Coliform Bacteria

Total coliform refers to a group of bacteria which exists in the environment in soils, vegetation and animals. The majority of this group of organisms, however, inhabit the intestinal tracts of warm blooded animals (enteric bacteria) and are released to the environment in the fecal wastes of such along with other pathogenic (disease causing) bacteria. Once so released, the life history or survival characteristics of these two bacteria types, in the alien environment, are similar. Thus, the presence of coliform organisms indicates the potential presence of disease causing organisms and/or enteric viruses. Coliform organisms by themselves do not cause disease, but since tests to determine the presence and amounts of pathogenic bacteria are very difficult and costly to perform, it is widely used as an indicator and monitoring test. When enteric pathogenic bacteria or viruses are present in water, which is eventually used for drinking water purposes, they can cause epidemic diseases, such as typhoid, dysentery and infectious hepatitis. When present in surface lakes, ponds, rivers or streams, the risks are not as great but may eventually infect humans by contact in bathing or by transmission through other animals.

### B.22 Fecal Coliform Bacteria

Some members of the coliform group do not inhabit the intestines of warm blooded animals, but occur naturally in soils and on vegetation and, as a result, are likely to be present in water. To differentiate between these two groups, the fecal coliform test is used. Fecal coliform are those bacteria that occur only in the intestines of warm blooded animals. Their presence in water indicates definite fecal contamination of animal origin, but not necessarily from man.

### B.23 Fecal Streptococcus Bacteria

This group of non-pathogenic bacteria includes a number of species which inhabit the intestines of warm blooded animals and are excreted with the fecal matter. It is therefore an indicator of fecal contamination. However, there is at least one species which is not limited to the intestine of man and animals, but has also been found associated with vegetation insects and certain types of soils. The standard fecal streptococcus test measures all species and by itself is of limited value in establishing the presence of fecal pollution in water or wastewater. However, when results are combined with the fecal coliform test data, more specific information may be obtained about the source of the bacterial contamination of the water.

### B.24 Fecal Coliform/Fecal Streptococcus Bacteria Ratio

In order to more definitively identify the likely source of fecal contamination of a water, (i.e., human or non-human), the recently developed fecal coliform/fecal streptococcus count ratio (FC/FS) can be used. Estimates of per capita contributions of fecal coliforms and fecal streptococcus bacteria for animals were used to develop the following FC/FS ratios:

| | |
|---|---|
| -- Humans | 4.4 |
| -- Ducks | 0.6 |
| -- Sheep | 0.4 |
| -- Chickens | 0.4 |
| -- Pigs | 0.4 |
| -- Cows | 0.2 |
| -- Turkeys | 0.1 |

Thus, an FC/FS ratio of greater than 4:1 in a fresh water sample is considered indicative of pollution derived from municipal wastes composed of human excrement. Ratios less than 0.6 suggest that pollution was due to non-human sources. Ratios in between 0.6 and 4.1 are less definitive. However, in order for these ratios to be valid, certain other environmental conditions must be met and considered.

Computation of the FC/FS ratio and analysis of all the bacteria data results for a particular water quality sampling location allows one to assess the upstream sources of pollution as to whether or not they are of human origin.

## B.25 Surfactants (Anionic)

This is the term applied to commercially available synthetic detergents used in the household for general cleaning purposes, so named because they contain anionic surface-active agents. When released to a surface water, these are of concern for three (3) reasons. First, in concentrations around 0.5 mg/l, they will cause the water to foam and form an unsightly froth under certain conditions. Secondly, since the new detergents are now relatively biodegradable (i.e., easily converted by biochemical means to less objectionable and harmful compounds), their degradation, along with other organic wastes, requires the use of oxygen which can place an excessive demand on the water system using oxygen which is needed by aquatic animals for survival. Thirdly, they release nutrient chemicals which may stimulate algae blooms, again creating aesthetically undesirable conditions. Caution must be exercised in interpreting low surfactant readings because there are naturally occurring organic compounds in surface waters that respond positively to the test.

### B.26 Total Phosphorous

Phosphorous is of interest and concern in water quality assessments because it is one of the necessary nutrient compounds for phytoplankton and specifically, algae growth. Excessive and elevated rates of production of aquatic vegetation in a surface water body is termed eutrophication. If continued over a long enough period of time, the result will be the eventual "drying up" of the body of water with dense vegetation. This process occurs naturally with all water bodies, but in the absence of any outside stimulus, the rate of change is hardly noticeable. In order for the growth of phytoplankton to take place, various chemical nutrients are required. The three (3) main requirements are carbon, nitrogen and phosphorous. Phosphorous is the limiting nutrient (i.e., rate controlling) in the eutrophication process and supplying it to a body of water will hasten the rate. Consequently, in the fight to slow down the eutrophication process, phosphorous is the variable usually selected for control. Flowing water, with greater than 0.1 mg/l total phosphorous, is susceptible to algal blooms, while the value for impounded waters is 0.01 mg/l as ortho-phosphate. There are two principle sources of the phosphorous found in water. It is contained in soluble, natural and artificial fertilizers which are applied to agricultural land and may wash off in surface run-off. Finally, it is present in soluble forms of detergents and human wastes. From this, it may enter the groundwater or surface water in household disposal unit effluents. Phosphate can also be present in bedrock, but leaching of it into natural waters is a slow process.

### B.27 Nitrogen (Nitrite & Nitrate, Total Kjeldahl)

Nitrogen, like phosphorous, is a necessary nutrient for the growth of aquatic vegetation but is usually readily available and rapidly cycled through the environment. It is present in the aquatic environment principally in its organic forms nitrate ($NO_3^-$), nitrite ($NO_2^-$), ammonia ($NH_3$) and ammonium

$(NH_4^+)$. In the organic form, it is found in complex proteins, amino acids, peptides and other compounds. It is measured along with ammonia by the Total Kjeldahl nitrogen procedure. Organic nitrogen is analyzed because human wastes contain large quantities of it, and often times, they are soluble and will pass through an on-lot disposal system. Organic nitrogen compounds are converted by bacteria in the environment to less complex nitrogen compounds which eventually end up as free ammonia. Other bacteria in the environment using oxygen convert ammonia to nitrite and then to nitrate. Nitrate in the water and soil (and the other inorganic forms of nitrogen) are then taken up by plants and algae in their growth and reconverted to organic forms to build their structure. The problem is complicated somewhat by the fact that other sources besides human wastes exist for supplying nitrogen to a water body. Artificial and natural fertilizers contain nitrogen as nitrate, nitrite and organic nitrogen, all of which can wind up as nitrate in water. In addition, naturally decaying vegetation will release some nitrogen. Nitrate (and nitrite) is of interest because in concentration in excess of 10 mg/l N, it can cause a fatal infant disease called methemoglobinemia (blue babies). The other forms of nitrogen, especially nitrite and ammonia, are of concern in water since they consume oxygen for their conversion which respiring aquatic animals may need (fish). Ammonia is also toxic to fish in high enough concentrations.

### B.28 Biochemical Oxygen Demand ($BOD_5$) and Chemical Demand (COD)

These two tests are used to assess the amount of oxygen that will be used in biochemical processes in a water and, hence, will not be available for use by zooplankton and other aquatic animals (fish) for breathing.

BOD is a measure of the amount of oxygen that will be consumed in a receiving water as a result of microbiological decomposition of organic wastes (human, industrial and natural). BOD represents the portion of a waste that can be easily decomposed by biological activity.

COD is a measure of both the easily decomposed material and also the biologically resistant material and chemically oxidizable inorganic material. It is most often used to evaluate complex materials such as paper and pulp wastes for which the BOD test fails.

## B.3 Sampling Sites & Field Observations

The following is a summary of the field notes on each sampling location which includes a description of the sites. Figure 1-4 shows specific locations. Each site was a surface water site and was sampled on four (4) separate occasions, except where noted.

### B.31 Site #1

This site is located over the North Branford line on North Branford Road where the outlet stream from the Pistapaug Pond crosses the road. This area is both unpopulated and uncultivated. The stream flows through a wooded area, under the road and continues through an open field possibly used for grazing. Foam was observed downstream during one of the sampling runs. This site was sampled twice. The USGS data set also provides information for this location.

### B.32 Site #2

This site is located where the Farm River crosses under Reed's Gap Road. There are a few houses above the stream as well as a cultivated field. A drain pipe running parallel to the road empties into the river. Above this site is surface drainage from the White Hollow area. This was also a USGS site.

### B.33 Site #3

This site is found on Connecticut Route 17 where a tributary to the Farm River crosses under the road near the North Branford package store. Next to the package store, there is a house that has 50-60 fowl in the yard beside the stream. Although there were few houses in the immediate vicinity, there were a number of cultivated fields that had been recently turned over. USGS also sampled this site.

B.34 Site #4

This site is located at a bridge on Connecticut Route 22 where the Farm River crosses under the road. There is a house upstream a few feet above river level with little else in the area. This was a USGS site also.

B.35 Site #5

This site is situated at the end of an unmarked dirt road off Totoket Road. It lies above Pages Mill Pond below a housing development. Both cultivated and uncultivated fields border this site. This was also a USGS sampling site.

B.36 Site #6

This site is on Mill Road off Totoket Road. The samples were taken past the waterfall after the stream passed under the road below Mill Pond. A field for grazing sloped down to the stream. Green scum was observed on the borders of Pages Mill Pond but the stream below was too swiftly running to allow it to accumulate.

B.37 Site #7

This site is situated where the Farm River passes behind the houses at the end of Katherine Street off of Foxon Road. The stream moves slowly behind the development and through the woods. There seemed to be little agricultural activity in the immediate area.

B.38 Site #8

This site is at the drainage ditch by the school at Foxon Road. The stream goes under the parking lot and tennis court before surfacing again in the ditch. It then flows past six to twelve dwellings which are located on high ground.

B.39 Site #9

Site #9 is located on the same tributary of the Farm River as Site #8 but further downstream. It flows through a housing development and then through a field on Foxon Road. Foam was observed as well as bits of detritus. The Arthur Road area is immediately above this site.

### B.391 Site #10

This site is the last of the three sites (8, 9 & 10) on the same tributary of the Farm River. It is located where the stream crosses Totoket Road after flowing through a few housing developments. No agricultural activity was noted in this area. USGS also sampled this site.

### B.392 Site #11

Site #11 is located on River Road off Foxon Road where the Farm River crosses under the road. Aside from one house directly above the sampling site, there were few houses in the area. The river was slowly moving and clear. During one sampling run, a boy was seen to catch a trout.

### B.393 Site #12

This site is located at the end of Carlen Drive off Birchwood Road on Connecticut Route 22. The stream passes through a housing development and into a small pond which is relatively clear. Most of the houses are new and lots drain directly towards the stream.

### B.394 Site #13

This site is located where a stream flows through a large, new housing development at the end of Ruta Drive. Small amounts of foam were observed at the sampling site. House lots in the development generally slope towards the stream.

### B.395 Site #14

Site #14 is located on Fowler Road off Foxon Road where the stream passes under the road. The stream drains a swampy area in which two business concerns are located.

## B.4 Discussion of Analytical Results

### B.41 Site #1

Pistapaug Pond outlet at North Branford Road in Wallingford

The availability of only two sets of data limits the conclusions concerning this site. This site was originally intended for comparison purposes since it is a fairly isolated area. Pistapaug Pond is located in an undeveloped area. There were no homes or observed agricultural activity in the immediate area. The pond is well protected and not utilized for any recreational activity. It serves as a source for the Wallingford water supply and is thus fenced in and protected. It therefore must be considered to represent a near optimum water quality condition for this area. With only two sampling runs available for comparison, the bacteriological results, although higher than some of the other sites, are generally low and are not of human origin. The FC/FS ratios are high enough to indicate human origin but the length of water retention in the pond and the lack of any known human activity around it make this ratio suspect. The counts used in computing the highest ratio are less than the recommended level. The likely source of bacteria is warm blooded animals.

### B.42 Site #2

Reeds Gap Road

The four sets of results for this site on the Farm River indicate no significant water quality problems. The river at this site maintains a good, constant flow and the inputs from any anthropogenic activity above this site appear to be largely diluted, assimilated and dispersed by normal aquatic biochemical activity within the system. If on-lot disposal system failure is suspected in the immediate area above the site, the water quality testing performed does not support this.

Two (2) of the four FC/FS ratios computed indicate a possible human source (_1), but the counts used to calculate one of the ratios was lower than the recommended ( 100) for accurate validity of the developed ratios. All other indicators of anthropogenic activity or fecal discharges are comparatively low. Total phosphorous (ave. 0.02 mg/l), surfactants (1 of 4 values positive) and Total Kjeldahl Nitrogen (ave. 0.23 mg/l) are all relatively low. The nitrate and nitrite nitrogen values (ave. 0.8 mg-N/l) are slightly elevated but not unusual for a river basin draining agricultural and grazing land. This site had the second lowest average.

### B.43 Site #3

Durham Road

This site was only sampled three (3) times due to time problems. Immediately upstream from this site and draining into the stream is extensive agricultural activity. Some fields had been recently turned over. Many fowl and some livestock were grazing upstream and next to the stream.

The FC/FS ratios do not indicate a human source with the slightly elevated counts attributable to the upstream livestock. Total phosphorous and nitrite and nitrate values are elevated but expected due to the agricultural activity upstream. No surfactants or significant organic loadings were detected for the three (3) sampling times.

### B.44 Site #4

Northford

Water quality sampling at this site indicates no significant upstream sources of human wastes. Although the FC/FS ratios are all greater than 1, the counts for all but the first sampling run were less than the recommended ( 100) value for valid application. No surfactants were detected, phosphorous levels are low and no organic pollution was detected. Nitrite and nitrate values were consistent and likely derived from fertilizers in drained upstream fields.

### B.45 Site #5

Above Pages Mill Pond

This site was only sampled three (3) times due to difficulty in initially locating its position.

The bacteria results and FC/FS ratios indicate no heavy upstream human wastes entering the river. The one observed high FC/FS ratio was computed with low ( 100 colonies/100 ml) counts and is invalid. All bacteria counts for this site were low. One positive, but comparatively low, surfactant reading was obtained but the method responds positively to other natural chemicals.

Total phosphorous levels were low and no organic loading was measurable. Levels of nitrogen (nitrite, nitrate and total kjeldahl nitrogen), although elevated, are comparable with those observed in other parts of the river and within the range of values found in the U.S. Geological Survey data at a site above this. The likely source of nitrate is surface drainage of agricultural fields containing natural and artificial fertilizers and livestock wastes. The levels of nitrite and nitrate were well below the Federal standard set for drinking waters at 10 mg-N/l.

### B.46 Site #6

Below Pages Mill Pond

The results for this site on the Farm River just below Pages Mill Pond also indicates no significant water pollution problems from upstream human discharges. The water in this area is impounded by the dam at the outlet of the pond allowing a significant retention time. At this time of the year (Spring), this allows nutrients to be taken up by phytoplankton during growth and reduces the concentrations observed downstream. FC/FS ratios and overall bacteria counts at this site do not indicate human sewage to be present. Total and fecal coliform counts are low and no surfactants were detected. Phosphorous levels were low to moderate, but probably high enough to support some algae growth within Pages Mill Pond. Such growth was observed during the last sampling run along the shoreline. Nitrogen levels were elevated again but consistent with upstream values. BOD and COD values again indicate no organic overloading.

B.47 Site #7

Farm River at Katherine Street

This site on the Farm River below Site #6 also shows no indication of upstream human pollution (based upon the bacteriological) results. Only one (1) of the four (4) FC/FS ratios exceed 1.0, but the counts composing it were 101 and 80 and thus on the borderline of usefulness. One positive, but low, surfactant reading was obtained for the second sampling, but total phosphorous and nitrite-nitrate values for this date were not concurrently higher. Overall phosphorous levels at this site are measurably above those upstream at Site #6, but not significantly high. A similar trend is observed for the forms of nitrogen (Total Kjeldahl and nitrite-nitrate). Organic levels were again low.

B.48 Site #8

Burrs Brook at Middle School

The bacteriological results at Site #8 do not indicate the presence of human fecal contamination. FC/FS ratios were low or not valid with the fecal coliform counts being very low for three (3) out of the four (4) runs, but the sampling site likely contains input from surface drainage of the nearby school lot and playground. However, total phosphorous (ave. 0.15 mg/l) and nitrite-nitrate (ave. 1.1 mg-N/l) levels were equal to or greater than values obtained at sites on the Farm River likely receiving surface drainage from agricultural and grazing fields. This indicates the potential for some upstream human source since little such land exists above this site. Positive, but very low and therefore dubious, surfactant readings were obtained, and no significant organic levels were measurable. A single, high Kjeldahl nitrogen value was obtained for the first sampling run but subsequent values were not significant.

### B.49 Site #9

Burrs Brook below Arthur Court

With two (2) of the four (4) FC/FS ratios at this site in the range indicative of human fecal origin, there is a potential for some upstream on-lot system failure in this area. A third ratio was near the lower indicative level with the fourth value for the first sampling run being the only discrepancy. This sampling, however, was done when there were still significant amounts of snow left on the ground. High total coliform counts were obtained at this site and the last three sampling runs showed consistent, comparatively elevated fecal and streptococcus counts.

Phosphorous and nitrogen levels parallel those at the upstream Site #8. Two positive but again suspect surfactant values were obtained. Organic loading tests were again inconclusive.

### B.491 Site #10

Burrs Brook at Totoket Road

At Site #10, the effects of any upstream human pollution as evident in bacteriological results has largely dissipated. Only two (2) FC/FS ratios are high, but these are based on low counts. Total coliform counts were low for the last two sampling runs with the fecal and streptococcus results being very low over the last three (3) runs.

Total phosphorous and nitrogen levels were nearly equal to those at the upstream sites and showed the similar pattern of the highest reading during the first sampling run. A single, positive but again low surfactant reading was obtained for the first sampling date, but no measurable organic matter was found.

### B.492 Site #11

Farm River above Northford Diversion

The results for this site on the Farm River below the study area represent the combined levels of the

Farm River and its tributary flowing through Site #8, 9 and 10. The bacteriological results do not indicate the presence of any upstream human wastes, the single high FC/FS ratio being derived from low counts. Generally, all bacteria counts are comparatively low at this site.

Phosphorous levels are not significantly elevated here and correspond with those observed at Site #7 and 10 on equivalent sampling dates. Nitrogen shows a similar pattern, although the nitrite-nitrate levels are slightly increased. The major source of this is still thought to be upstream surface drainage of cultivated and grazing land. No significant surfactants or organic loadings could be detected.

### B.493 Site #12

Muddy River Drainage

The results for this site, a stream off Carlen Drive, indicate the possibility of human wastes entering this stream. Lots bordering this stream on Carlen Drive generally slope towards it. The bacteriological results are not conclusive. Only one representative valid FC/FS ratio was obtained for the last sampling run. Total coliform counts for all runs were comparatively elevated, but fecal counts were very low during the second and third sampling. However, total phosphorous values were consistent and noticeably elevated for such a small stream.

Nitrogen levels were also significantly high for the primarily residential area this stream drains. There is little apparent agricultural activity in upstream watershed areas. Overall nitrite-nitrate levels were within the range observed for Farm River sites where agricultural and grazing land drainage is the likely primary source. Two positive surfactant readings were obtained at this site but only the first run value safely indicates the presence of detergents. $BOD_5$ data are low and consistent with other sites, but the single last run COD test did indicate the likely presence of small amounts of organic matter.

### B.494 Site #13

Eight Mile Brook at Green Acres

There is definite evidence that on-lot disposal system wastes are entering this stream. Total coliform counts were high for the first three sampling runs with two of the computed FC/FS ratios (second and third run) above 0.6. The last run also had a high ratio but the fecal count was less than 100 and no growth of fecal streptococcus colonies was observed. Counts for the first sampling run were generally higher than for subsequent dates.

Phosphorous levels in this stream are high and consistent throughout the four (4) samplings. The highest value was again obtained from the first run. Two of the available nitrite-nitrate values are elevated with the third or last run being significantly lower. The large number of residential lots and their obvious slope towards this stream undoubtedly result in it receiving considerable amounts of normal surface and street drainage. However, the detection of three (3) out of four (4) positive surfactant values (all less than 0.1 mg/l) and the field observation of foam at the site is strong evidence of the presence of human sewerage and likely on-lot system failures.

The parameters used to assess levels of organic loadings (BOD and COD) gave inconclusive results.

### B.495 Site #14

Munger Brook above North Branford Village

The results for this site on Munger Brook in the southeastern section of the Town do not indicate any adverse water quality conditions or the presence of human wastes. Bacteria counts were generally low, the highest values being obtained for the first sampling. One FC/FS ratio was above 0.6 but was computed using low counts ( 100).

Phosphorous levels were very low for the three sampling runs and nitrite-nitrate levels were significantly below nearly all other sites. In addition, no positive surfactant results were observed and organic levels appeared low. The last sampling did result in a measurable but low COD value of 7.4 mg/l.

### B.496 Water Quality Data

The actual data collected for the North Branford EIS is shown in Tables B-1 through B-9. The abbreviations that are used are explained below:

| | |
|---|---|
| MF | Membrane filter technique |
| NR | No results available due to analytical procedural problems. |
| TNTC | Too numerous to count |
| NG | No growth |
| IS | Insufficient volume for analysis |
| * | Indicates a poor degree of accuracy due to number of colonies outside recommended range. |
| ** | Due to consistently low BOD's, COD's were substituted for higher accuracy. |

## TABLE B-1

## TOTAL COLIFORM (MF) DATA

| Site No. | Run #1 Col/100mls. | Run #2 Col/100mls. | Run #3 Col/100mls. | Run #4 Col/100mls. |
|---|---|---|---|---|
| 1 | ______ | ______ | TNTC | 747 |
| 2 | 2400 | 350 | 6000 | 1670 |
| 3 | 1200* | ______ | 600 | 2360 |
| 4 | 3900 | 120 | 900 | 440 |
| 5 | ______ | 211 | 1038 | 877 |
| 6 | 2900 | 100* | 60 | 343* |
| 7 | 21,300* | NG | 1330 | 560 |
| 8 | 9000 | NG | 5700 | 3350 |
| 9 | TNTC | 70,000 | 630,000 | 65,500 |
| 10 | TNTC | 5000 | 300 | 166 |
| 11 | 3700 | 650 | 70 | 113 |
| 12 | 8300 | 3000 | 1353 | 17,600 |
| 13 | 16,400* | 11,400 | 17,800 | 600 |
| 14 | 3000 | 80 | 487 | 730 |

## TABLE B-2

## FECAL COLIFORM (MF) DATA

| Site No. | Run #1 Col/100mls. | Run #2 Col/100mls. | Run #3 Col/100mls. | Run #4 Col/100mls |
|---|---|---|---|---|
| 1 | ______ | ______ | 72 | 138 |
| 2 | 340 | 24 | 7 | 8 |
| 3 | 700 | ______ | 20 | 204 |
| 4 | 3600 | 60 | 10 | 25 |
| 5 | ______ | 46 | 1 | 36 |
| 6 | 320 | 83 | 2 | 37 |
| 7 | 400 | 110 | 120 | 101 |
| 8 | 1600 | 10* | NG | 16 |
| 9 | 1000 | 200* | 180 | 468 |
| 10 | 540 | 47 | NG | 26 |
| 11 | 100* | 127 | 4 | 111 |
| 12 | 1800* | 20* | NG | 300 |
| 13 | 510 | 127 | 480 | 63* |
| 14 | 110 | 6* | NG | 32* |

## TABLE B-3

## FECAL STREPTOCOCCUS (MF) DATA

| Site No. | Run #1 Col/100mls. | Run #2 Col/100 mls. | Run #3 Col/100mls. | Run #4 Col/100mls |
|---|---|---|---|---|
| 1 | ______ | ______ | 36 | 260 |
| 2 | 300* | 61 | 16 | 8* |
| 3 | 1460* | ______ | 530 | 345 |
| 4 | 2500 | 10 | 10 | 12* |
| 5 | ______ | 127 | 3 | 38* |
| 6 | 15,100* | 280 | NG | 59* |
| 7 | 17,300* | 950 | 450 | 80* |
| 8 | TNTC | NG | 80 | 106* |
| 9 | 22,200* | 480 | 160 | 418 |
| 10 | 178,000* | 50 | 10 | 19* |
| 11 | TNTC | 2200 | 600 | 10* |
| 12 | 8600 | 520 | 140 | 110* |
| 13 | TNTC | NG | 480 | NG |
| 14 | 3200 | 20 | 110 | 10 |

# TABLE B-4

## FECAL COLIFORM/FECAL STREPTOCOCCUS RATIOS

| Site No. | Run #1 | Run #2 | Run #3 | Run #4 |
|---|---|---|---|---|
| 1 | — | — | 2 | 0.53 |
| 2 | 1.1 | 0.4 | 0.4 | 1.0 |
| 3 | .5 | — | .04 | 0.59 |
| 4 | 1.4 | 6.0 | 1.0 | 2.08 |
| 5 | — | 0.4 | .3 | 1.09 |
| 6 | .02 | .3 | >.2 | 0.62 |
| 7 | .02 | .1 | 0.3 | 1.26 |
| 8 | <.2 | >.1 | .1 | 0.15 |
| 9 | .04 | .4 | 1.1 | 1.11 |
| 10 | .003 | .9 | <.1 | 1.36 |
| 11 | <.01 | .06 | .007 | 11.1 |
| 12 | .2 | .04 | <.7 | 2.7 |
| 13 | <.05 | >1.3 | 1 | 63.0* |
| 14 | .03 | 0.3 | <.03 | 3.2 |

---

(*) Signifies no growth.

B-22

## TABLE B-5

## TOTAL KJELDAHL NITROGEN

| Site No. | Run #1 mg-N/l | Run #2 mg-N/l | Run #3 mg-N/l | Run #4 mg-N/l |
|---|---|---|---|---|
| 1 | ____ | ____ | 0.20 | 0.11 |
| 2 | 0.62 | 0.15 | 0.05 | 0.10 |
| 3 | 1.45 | ____ | 0.12 | 0.12 |
| 4 | 0.63 | 0.15 | 0.05 | 0.10 |
| 5 | ____ | 0.23 | 0.28 | 0.12 |
| 6 | 0.88 | 0.15 | 0.08 | 0.12 |
| 7 | 1.12 | 0.23 | 0.10 | 0.20 |
| 8 | 1.55 | 0.23 | 0.08 | 0.12 |
| 9 | 0.73 | 0.18 | 0.20 | 0.16 |
| 10 | 0.72 | ____ | 0.18 | 0.10 |
| 11 | 0.65 | 0.15 | 0.12 | 0.37 |
| 12 | 0.44 | 0.33 | 0.23 | 0.28 |
| 13 | 0.58 | 0.34 | 0.15 | 0.18 |
| 14 | 0.23 | 0.24 | 0.06 | 0.13 |

## TABLE B-6

## NITRITE - NITRATE DATA

| Site No. | Run #1 mg-N/l | Run #2 mg-N/l | Run #3 mg-N/l | Run #4 mg-N/l |
|---|---|---|---|---|
| 1 | ______ | ______ | 2.7 | 0.7 |
| 2 | 1.3 | 0.7 | 0.9 | 0.2 |
| 3 | 2.0 | ______ | 1.8 | 0.6 |
| 4 | 1.5 | 1.3 | 1.3 | 0.7 |
| 5 | ______ | 1.6 | 2.2 | 1.2 |
| 6 | 1.5 | 1.0 | 2.2 | 1.3 |
| 7 | 2.0 | 1.4 | 2.5 | 1.3 |
| 8 | 1.2 | 1.4 | 1.2 | 0.7 |
| 9 | 1.1 | 1.3 | 1.5 | 0.7 |
| 10 | 1.1 | 1.4 | 1.3 | 0.7 |
| 11 | 1.8 | 1.5 | 2.5 | 1.3 |
| 12 | 1.3 | 1.3 | 1.1 | 0.7 |
| 13 | I.S. | 1.5 | 1.6 | 0.3 |
| 14 | 0.7 | 0.4 | 0.5 | 0.4 |

B-24

## TABLE B-7

## TOTAL PHOSPHATE DATA

| Site No. | Run #1 mg-P/l | Run #2 mg-P/l | Run #3 mg-P/l | Run #4 mg-P/l |
|---|---|---|---|---|
| 1 | ——— | ——— | .04 | .05 |
| 2 | .02 | .02 | .01 | .03 |
| 3 | .04 | ——— | .03 | .06 |
| 4 | .04 | .02 | .02 | .03 |
| 5 | ——— | .02 | <.01 | <.01 |
| 6 | .07 | .03 | .03 | .01 |
| 7 | .16 | .05 | .06 | .03 |
| 8 | .42 | .09 | .04 | .06 |
| 9 | .22 | .05 | .05 | .05 |
| 10 | .20 | .02 | .04 | .06 |
| 11 | .12 | .04 | .03 | .03 |
| 12 | .12 | .07 | .10 | .19 |
| 13 | .16 | .10 | .11 | .09 |
| 14 | <.01 | <.01 | .04 | .01 |

## TABLE B-8

## $BOD_5$ & COD DATA

|  |  | $BOD_5$ |  | COD** |
|---|---|---|---|---|
| Site No. | Run #1 mg.1 | Run #2 mg/1 | Run #3 mg/1 | Run #4 mg/1 |
| 1 | ——— | ——— | 0.3 | <5.0 |
| 2 | NR | 1.3 | 0.8 | <5.0 |
| 3 | NR | ——— | 0.5 | <5.0 |
| 4 | NR | 0.6 | 0.3 | <5.0 |
| 5 | ——— | 1.0 | 0.4 | <5.0 |
| 6 | NR | 0.8 | 0.5 | <5.0 |
| 7 | NR | 0.7 | 1.0 | 8.4 |
| 8 | NR | 1.7 | 0.3 | <5.0 |
| 9 | NR | 2.2 | 0.8 | <5.0 |
| 10 | NR | 2.1 | 0.3 | 6.3 |
| 11 | NR | 1.7 | 0.8 | 5.0 |
| 12 | NR | 2.1 | 0.6 | 9.9 |
| 13 | NR | 1.6 | 1.0 | <5.0 |
| 14 | NR | 2.3 | 0.5 | 7.4 |

## TABLE OF CONTENTS

PAGE

SECTION 1.0 - SUMMARY

| | | | |
|---|---|---|---|
| 1.1 | General Discussion........................ | 3 | 1/B8 |
| 1.2 | Federal and State Programs.............. | 3 | 1/B8 |
| 1.21 | P.L. 92-500............................. | 5 | 1/B10 |
| 1.22 | Construction Grants Program............. | 5 | 1/B10 |
| 1.23 | PRM 78-9................................ | 6 | 1/B11 |
| 1.24 | 1977 WPCA Amendments.................... | 6 | 1/B11 |
| 1.25 | State Program and Responsibilities...... | 7 | 1/B12 |
| 1.3 | Local Involvement....................... | 8 | 1/B13 |
| 1.31 | Town Plan of Development................ | 9 | 1/B14 |
| 1.32 | Town Sewer Plans........................ | 9 | 1/B14 |
| 1.33 | Environmental Review Process............ | 11 | 1/C2 |
| 1.4 | EIS Work Program........................ | 12 | 1/C3 |
| 1.41 | Issues.................................. | 12 | 1/C3 |
| 1.42 | Public Participation Program............ | 15 | 1/C9 |
| 1.421 | Newsletters............................. | 15 | 1/C9 |
| 1.422 | Questionnaire........................... | 16 | 1/C10 |
| 1.423 | Workshops............................... | 17 | 1/C11 |
| 1.43 | General Data Collection................. | 18 | 1/C12 |
| 1.44 | EIS Field Work.......................... | 18 | 1/C12 |
| 1.441 | Windshield Surveys...................... | 19 | 1/C13 |
| 1.442 | Connecticut DEP Survey.................. | 19 | 1/C13 |
| 1.443 | Follow-up Survey........................ | 20 | 1/C14 |
| 1.444 | Water Quality Sampling.................. | 21 | 1/D1 |
| 1.5 | Overview of Analysis of Alternatives............................ | 25 | 1/D9 |
| 1.51 | General Alternative Concepts............ | 27 | 1/D11 |
| 1.52 | Potential Impacts of Alternatives............................ | 27 | 1/D11 |
| 1.53 | Screening of Alternatives............... | 28 | 1/D12 |
| 1.54 | Conclusions............................. | 29 | 1/D13 |

SECTION 2.0 - PURPOSE AND NEED

| | | | |
|---|---|---|---|
| 2.1 | Precipitating Action.................... | 33 | 1/E3 |
| 2.2 | EIS Findings............................ | 33 | 1/E3 |
| 2.3 | EIS Recommendations..................... | 33 | 1/E3 |

## TABLE OF CONTENTS (Cont'd)

PAGE

SECTION 3.0 - ALTERNATIVES INCLUDING THE PROPOSED ACTION

3.1 General Discussion of Alternatives...... 37 1/E7
3.2 No Action................................ 37 1/E7
3.3 On-Site Solutions........................ 37 1/E7
3.31 Changes in Use of the Existing Septic Systems.......................... 38 1/E8
3.32 Repairs to Septic Systems............... 39 1/E9
3.33 Expansion of Existing Systems........... 39 1/E9
3.34 Replacement of the Leaching Field....... 39 1/E9
3.35 Site Modification/Curtain Drains........ 40 1/E10
3.36 Mounded/Pumped Systems.................. 40 1/E10
3.37 Summary................................. 41 1/E11
3.4 Local Sewer Systems...................... 41 1/E11
3.5 Town-Wide Sewer System................... 42 1/E12
3.6 Development of Alternatives for North Branford.......................... 43 1/E12
3.61 Problem Areas........................... 43 1/E12
3.62 Alternative Concepts.................... 47 1/F6
3.63 Foxon Area Alternatives................. 48 1/F7
3.631 Foxon Alternative A - Continued On-Site................................ 49 1/F8
3.632 Foxon Alternative B - Community System................................. 49 1/F8
3.633 Foxon Alternative C - Limited Sewer System........................... 49 1/F8
3.634 Foxon Alternative D - Full Sewer System................................. 49 1/F8
3.64 Green Acres Area Alternatives........... 53 1/F12
3.641 Green Acres Alternative A - Continued On-Site...................... 53 1/F12
3.642 Green Acres Alternative B - Sewer System........................... 53 1/F12
3.65 White Hollow Area Alternatives.......... 55 1/F14
3.651 White Hollow Alternative A - Continued On-Site...................... 55 1/F14
3.652 White Hollow Alternative B - Community Systems...................... 55 1/F14
3.653 White Hollow Alternative C - Limited Sewer System.................... 55 1/F14
3.654 White Hollow Alternative D - Full Sewer System...................... 55 1/F14

## TABLE OF CONTENTS (Cont'd)

| | | PAGE | |
|---|---|---|---|
| 3.66 | Potential Impacts of Alternatives....... | 59 | 1/G4 |
| 3.661 | Public Health.......................... | 59 | 1/G4 |
| 3.662 | Aesthetics............................. | 59 | 1/G4 |
| 3.663 | Potential Habitat...................... | 59 | 1/G4 |
| 3.664 | Future Water Supply.................... | 60 | 1/G5 |
| 3.665 | Wetlands............................... | 60 | 1/G5 |
| 3.666 | Existing Habitat....................... | 60 | 1/G5 |
| 3.667 | Farmland............................... | 60 | 1/G5 |
| 3.668 | Planned Development.................... | 60 | 1/G5 |
| 3.669 | Economic Growth........................ | 60 | 1/G5 |
| 3.6610 | Community Character.................... | 60 | 1/G5 |
| 3.6611 | Cost Effectiveness..................... | 60 | 1/G5 |
| 3.6612 | Conformance with PRM's................. | 61 | 1/G6 |
| 3.6613 | Local Acceptance....................... | 61 | 1/G6 |
| 3.6614 | Future Provisions...................... | 61 | 1/G6 |
| 3.6615 | Ease of Management..................... | 61 | 1/G6 |
| 3.6616 | Individual Expense..................... | 61 | 1/G6 |
| 3.67 | Cost Effective Analysis................ | 61 | 1/G6 |
| 3.68 | Public Attitudes....................... | 61 | 1/G6 |
| 3.7 | Preferred Alternatives................. | 64 | 1/G10 |
| 3.71 | Foxon Alternative A - Continued On-Site.................................. | 64 | 1/G10 |
| 3.72 | Foxon Alternative B - Community System.................................. | 65 | 1/G11 |
| 3.73 | Foxon Alternative C - Limited Sewer System........................... | 65 | 1/G11 |
| 3.74 | Foxon Alternative D - Full Sewer System.................................. | 66 | 1/G12 |
| 3.75 | Green Acres Alternative A - Continued On-Site...................... | 66 | 1/G12 |
| 3.76 | Green Acres Alternative B - Limited Sewer System.................... | 66 | 1/G12 |
| 3.77 | White Hollow Alternative A - Continued On-Site...................... | 67 | 1/G13 |
| 3.78 | White Hollow Alternative B - Community System....................... | 67 | 1/G13 |
| 3.79 | White Hollow Alternative C - Limited Sewer System.................... | 67 | 1/G13 |
| 3.710 | White Hollow Alternative D - Full Sewer System...................... | 67 | 1/G13 |

# TABLE OF CONTENTS (Cont'd)

## SECTION 4.0 - AFFECTED ENVIRONMENT

| | | PAGE | |
|---|---|---|---|
| 4.1 | Natural Environment | 71 | 2/A10 |
| 4.11 | Topography/Hydrology | 71 | 2/A10 |
| 4.12 | Geology/Soils | 72 | 2/A11 |
| 4.13 | General Water Quality | 79 | 2/B10 |
| 4.14 | Climate | 81 | 2/B12 |
| 4.15 | Air Quality | 81 | 2/B12 |
| 4.16 | Sensitive Ecological Systems | 82 | 2/B13 |
| 4.2 | Human Environment | 83 | 2/B13 |
| 4.21 | General Land Use | 84 | 2/C1 |
| 4.211 | History | 84 | 2/C1 |
| 4.212 | Patterns | 85 | 2/C2 |
| 4.213 | EPA Resource Inventory | 89 | 2/C9 |
| 4.22 | Land Use Regulation | 90 | 2/C10 |
| 4.221 | Water Company Lands | 91 | 2/C11 |
| 4.222 | Zoning | 92 | 2/C12 |
| 4.223 | Wetland Regulations | 96 | 2/D5 |
| 4.224 | Floodplain Regulations | 97 | 2/D6 |
| 4.225 | Agricultural Preservation | 101 | 2/D13 |
| 4.3 | Growth & Development | 103 | 2/E1 |
| 4.31 | Population Projections | 103 | 2/E1 |
| 4.32 | Local Plan of Development | 105 | 2/E3 |
| 4.33 | Regional Plan | 107 | 2/E5 |
| 4.34 | State Plan of Conservation & Development | 110 | 2/E8 |
| 4.35 | Local Perceptions of Growth | 113 | 2/E11 |
| 4.4 | Characteristics of Resource Use | 114 | 2/E12 |
| 4.41 | Water Supply | 114 | 2/E12 |
| 4.411 | General | 114 | 2/E12 |
| 4.412 | New Haven Water Company | 116 | 2/E14 |
| 4.413 | Water Quality | 118 | 2/F2 |
| 4.42 | Wastewater Disposal | 121 | 2/F5 |
| 4.421 | Past and Current Practices | 121 | 2/F5 |
| 4.422 | Continuing Limitations | 122 | 2/F6 |

# TABLE OF CONTENTS (Cont'd)

PAGE

## SECTION 5.0 - ENVIRONMENTAL CONSEQUENCES

5.1 General Discussion.......................... 125 2/F9
5.2 No Action..................................... 128 2/F12
5.21 Future Development Scenario.............. 129 2/F13
5.22 Impacts on Water Resources.............. 131 2/G1
5.221 Public Health.............................. 131 2/G1
5.222 Future Water Supply...................... 133 2/G3
5.23 Impacts on Natural Systems.............. 134 2/G4
5.231 Wetlands..................................... 134 2/G4
5.232 Existing Habitat........................... 134 2/G4
5.24 Impacts on Human Resources.............. 135 2/G5
5.241 Farmland..................................... 135 2/G5
5.242 Planned Development...................... 136 2/G6
5.243 Economic Growth........................... 137 2/G7
5.244 Community Character...................... 137 2/G7
5.3 Town Proposal & Concept for Foxon Area.................................. 138 2/G8
5.31 Impacts on Water Resources.............. 139 2/G9
5.311 Public Health.............................. 139 2/G9
5.312 Future Water Supply...................... 140 2/G10
5.32 Impacts on Natural Systems.............. 141 2/G11
5.321 Wetlands..................................... 141 2/G11
5.322 Existing Habitat........................... 142 2/G12
5.33 Impacts on Human Resources.............. 142 2/G12
5.331 Farmlands.................................... 142 2/G12
5.332 Planned Development...................... 143 2/G13
5.333 Economic Growth........................... 144 2/G14
5.334 Community Character...................... 145 3/A8
5.4 Modified Foxon Proposal.................. 146 3/A9
5.41 Impacts on Water Resources.............. 147 3/A10
5.411 Public Health.............................. 147 3/A10
5.412 Future Water Supply. ..................... 148 3/A11
5.42 Impacts on Natural Systems.............. 148 3/A11
5.421 Wetlands..................................... 148 3/A11
5.422 Existing Habitat........................... 149 3/A12
5.43 Impacts on Human Resources.............. 149 3/A12
5.431 Farmlands.................................... 149 3/A12
5.432 Planned Development...................... 150 3/A13
5.433 Economic Growth........................... 150 3/A13
5.434 Community Character...................... 151 3/A14

## TABLE OF CONTENTS (Cont'd)

PAGE

5.5 Green Acres Area Rehabilitation......... 151 3/A14
5.51 Impacts on Water Resources.............. 152 3/B1
5.511 Public Health........................... 152 3/B1
5.512 Future Water Supply..................... 152 3/B1
5.52 Impacts on Natural Systems.............. 152 3/B1
5.53 Impacts on Human Resources.............. 152 3/B1
5.531 Farmlands............................... 152 3/B1
5.532 Planned Development..................... 153 3/B2
5.533 Economic Growth......................... 153 3/B2
5.534 Community Character..................... 153 3/B2
5.6 Green Acres Area Sewer Systems.......... 153 3/B2
5.61 Impacts on Water Resources.............. 154 3/B3
5.611 Public Health........................... 154 3/B3
5.612 Future Water Supply..................... 154 3/B3
5.62 Impacts on Natural Systems.............. 154 3/B3
5.621 Wetlands................................ 154 3/B3
5.622 Existing Habitat........................ 155 3/B4
5.63 Impacts on Human Resources.............. 155 3/B4
5.631 Farmland................................ 155 3/B4
5.632 Planned Development..................... 155 3/B4
5.633 Economic Growth......................... 155 3/B4
5.634 Community Character..................... 156 3/B5
5.7 White Hollow Area Rehabilitation........ 156 3/B5
5.71 Impacts on Water Resources.............. 156 3/B5
5.711 Public Health........................... 156 3/B5
5.712 Future Water Supply..................... 157 3/B6
5.72 Impacts on Natural Systems.............. 157 3/B6
5.721 Wetlands................................ 157 3/B6
5.722 Existing Habitat........................ 157 3/B6
5.73 Impacts on Human Resources.............. 157 3/B6
5.731 Farmland................................ 157 3/B6
5.732 Planned Development..................... 157 3/B6
5.733 Economic Growth......................... 157 3/B6
5.734 Community Character..................... 158 3/B7

TABLE OF CONTENTS (Cont'd)

| | | PAGE | |
|---|---|---|---|
| 5.8 | White Hollow Area Community Sewer....... | 158 | 3/B7 |
| 5.81 | Impacts on Water Resources.............. | 158 | 3/B7 |
| 5.811 | Public Health........................... | 158 | 3/B7 |
| 5.812 | Future Water Supply..................... | 159 | 3/B8 |
| 5.82 | Impacts on Natural Systems.............. | 159 | 3/B8 |
| 5.821 | Wetlands................................ | 159 | 3/B8 |
| 5.822 | Existing Habitat........................ | 160 | 3/B9 |
| 5.83 | Economic Growth......................... | 160 | 3/B9 |
| 5.84 | Community Character..................... | 161 | 3/B10 |
| 5.9 | Conclusions............................. | 161 | 3/B10 |
| 5.91 | Foxon Area.............................. | 161 | 3/B10 |
| 5.911 | Impacts Which Cannot Be Avoided......... | 167 | 3/C4 |
| 5.912 | Mitigative Measures..................... | 168 | 3/C5 |
| 5.92 | Green Acres Area........................ | 168 | 3/C5 |
| 5.921 | Impacts Which Cannot Be Avoided......... | 170 | 3/C7 |
| 5.922 | Mitigative Measures..................... | 170 | 3/C7 |
| 5.93 | White Hollow Area....................... | 170 | 3/C7 |
| 5.931 | Impacts Which Cannot Be Avoided......... | 171 | 3/C8 |
| 5.932 | Mitigative Measures..................... | 171 | 3/C8 |
| 5.94 | Areawide................................ | 172 | 2/C9 |
| SECTION 6.0 - LIST OF PREPARERS | | 173 | 3/C10 |
| APPENDIX A | PUBLIC PARTICIPATION | | 3/D2 |
| APPENDIX B | WATER QUALITY SAMPLING | | 3/E6 |
| APPENDIX C | DESCRIPTION & ECONOMICS OF ALTERNATIVES | | 4/A10 |
| APPENDIX D | DETERMINATION OF WASTEWATER NEED | | 4/E12 |
| APPENDIX E | BIBLIOGRAPHY | | 4/G4 |

## TABLE B-9

## SURFACTANT DATA

| Site No. | Run #1 mg/l | Run #2 mg/l | Run #3 mg/l | Run #4 mg/l |
|---|---|---|---|---|
| 1 | ——— | ——— | <.040 | 0.025 |
| 2 | .056 | <.040 | <.040 | 0.009 |
| 3 | <.040 | ——— | <.040 | 0.012 |
| 4 | <.040 | .044 | <.040 | 0.007 |
| 5 | ——— | .070 | <.040 | 0.019 |
| 6 | <.040 | .040 | <.040 | 0.022 |
| 7 | <.040 | .060 | <.040 | 0.019 |
| 8 | .040 | .046 | .040 | 0.025 |
| 9 | .040 | .050 | <.040 | 0.024 |
| 10 | .044 | <.040 | <.040 | 0.025 |
| 11 | <.040 | <.040 | <.040 | 0.025 |
| 12 | .064 | .040 | <.040 | 0.030 |
| 13 | .068 | .050 | .052 | 0.030 |
| 14 | <.040 | <.040 | <.040 | 0.022 |

# APPENDIX C

# DESCRIPTION & ECONOMICS OF ALTERNATIVES

---

This appendix contains the background on all costs used in the analysis of alternatives presented in this EIS. This appendix contains a number of tables that present both the "present worth" costs of alternatives and, where appropriate, a breakdown of project costs into individual, State and Federal costs.

# TABLE OF CONTENT

| | | PAGE |
|---|---|---|
| C.1 | Background............................ | C-1 |
| C.2 | Alternatives.......................... | C-1 |
| C.3 | Problem Areas......................... | C-2 |
| C.4 | Basis of Costs........................ | C-3 |
| C.5 | Present Worth......................... | C-4 |
| C.6 | The Tables............................ | C-4 |
| C.7 | The Analysis Process.................. | C-5 |
| TABLE C-1 | Summary of Problem Areas | C-2 |
| TABLE C-2 | Alternative 2 - Section "B" Community Leaching Fields | C-8 |
| TABLE C-3 | Alternative 3 - Section "B" Limited Sewering | C-9 |
| TABLE C-4 | Alternative 4 - Section "B" Areawide Sewering | C-10 |
| TABLE C-5 | Alternative 5 - Section "B" Limited Sewer in Foxon and Community Systems in Northern Section | C-11 |
| TABLE C-6 | Isolation of Costs, Community Leaching Fields in Northern Section B | C-12 |
| TABLE C-7 | Summary of Cost Estimates Section "B" | C-13 |
| TABLE C-8 | Foxon Area - Comparison of User Costs Community Systems Versus Limited Sewers | C-14 |

## TABLE OF CONTENTS (Cont'd)

| | | PAGE |
|---|---|---|
| TABLE C-9 | Individual Cost Estimates Community Systems - Section "B" Miller Road & Grant Road - Jerz Lane | C-15 |
| TABLE C-10 | Individual Cost Estimates Alternative 3 Versus Alternative 4 Section "B" | C-16 |
| TABLE C-11 | Alternative 1 - Section "C" On-Site Disposal | C-17 |
| TABLE C-11A | Alternative 2A - Section "C" Community Leaching Systems in White Hollow, Limited Sewers for Green Acres | C-18 |
| TABLE C-12 | Alternative 3 - Section "C" Limited Sewering | C-19 |
| TABLE C-13 | Alternative 2B - Section "C" Community Leaching Systems in White Hollow, Limited Sewers for Green Acres and Surrey | C-20 |
| TABLE C-13A | Alternative 3A - Section "C" Limited Sewers - Green Acres & Surrey | C-21 |
| TABLE C-13B | Alternative 3B - Section "C" Limited Sewers - Green Acres Only | C-22 |
| TABLE C-14 | Alternative 4 - Section "C" Areawide Sewering | C-23 |
| TABLE C-15 | Summary of Cost Estimates Section "C" | C-24 |
| TABLE C-16 | On-Site Disposal Individual Costs | C-25 |

## TABLE OF CONTENTS (Cont'd)

| | | PAGE |
|---|---|---|
| TABLE C-17 | Community Leaching Systems White Hollow Area, Individual Costs | C-26 |
| TABLE C-18 | Individual Costs Limited Sewering - Section "C" All Problem Areas | C-27 |
| TABLE C-19 | Individual Costs Limited Sewering - Section "C" Green Acres & Surrey | C-28 |
| TABLE C-20 | Individual Costs Limited Sewering - Section "C" Green Acres Only | C-29 |
| TABLE C-21 | Pressure Sewer System for Green Acres | C-30 |
| TABLE C-22 | Pressure Sewer System Green Acres and Surrey | C-31 |
| TABLE C-22A | Pressure Sewer System Green Acres Only | C-31 |
| TABLE C-23 | Individual Costs Pressure Sewer System | C-32 |

## C-1 Background

The original concept for sewers in North Branford ("SEWERAGE FEASIBILITY STUDY" NORTH BRANFORD, CONNECTICUT, FLAHERTY-GIAVARA & ASSOCIATES 1971) was designed to take advantage of regionalization opportunities. The concept, in effect, divided the Town into three sections, A, B & C (See Figure 1-3), and called for the transmission of wastewater collected in each section to the Towns of Branford, East Haven and North Haven, respectively (See Figure 1-2). Sewer construction is in progress in Section "A" and the sewer construction proposal for a portion of Section "C" has been been decided. Therefore, the EIS is limited to the analysis of alternatives for Section "B" and the remainder of Section "C".

## C-2 Alternatives

Four basic alternatives were applied as the solution of wastewater disposal problems in North Branford. These alternatives are:

- -- Continued reliance on on-site disposal with rehabilitation of problem units.
- -- Off-site disposal of wastewater from problem areas through small scale community leaching systems and on-site disposal for other areas.
- -- Off-site disposal of wastewater from problem areas through a limited sewer system and on-site disposal for other areas.
- -- Off-site disposal of wastewater from all units through an area-wide sewer system (the original concept).

These alternatives were combined where appropriate to suit the needs of the area studied.

## C-3 Problem Areas

The problem areas, as determined by the "Needs Analysis", are summarized below along with the number of units served in each area.

TABLE C-1

Summary of Problem Areas

| NAME | LOCATION | UNITS |
|---|---|---|
| Section "B" | Western and southwestern North Branford | 833 |
| Sunset Road<br>Brook Lane | Neighborhood south of Foxon Road | 60 |
| Arthur Court | Neighborhood south of Foxon Road made up of Arthur Court, Arthur Road and Edward Road | 76 |
| Dorie Drive | Neighborhood west of Forest Road, north of Foxon Road | 18 |
| Jerz Lane | Neighborhood west of Forest Road, north of Dorie Drive | 16 |
| Miller Road<br>Grant Drive | Neighborhood east of Forest Road in north portion of Section "B" | 40 |
| Section "C" | Northern North Branford | 1,179 |
| Surrey Drive | Neighborhood east of Village Street | 7 |
| Green Acres | Neighborhood west of Village Street, includes Nida, Ruta & Palanga Drives | 59<br>(43 existing) |
| White Hollow | Northeastern portion of North Branford, area south of Durham Road | 153 |

## C-4 Basis of Costs

The cost estimates developed for each alternative are based on the following:

- On-site systems will fail at a rate of 2% per year and each failure will require a repair that costs, on the average, $2,000.

- Community leaching systems in all areas except the Foxon area (Sunset/Brook, Arthur Court and Dorie Drive) can take advantage of gravity flow from existing septic tanks through small diameter pipes to convey the sewage to community leaching fields (in some cases, pumping is required to move the septic tank effluent to the leaching fields).

- Community leaching systems in the Foxon area will require individual grinder pumps and pressure sewer systems to convey the wastewater to the community leaching fields.

- Community leaching fields are sized at 1,000 square feet per house served.

- Implementation costs (engineering, legal fees, project administration) are 30% of the municipal construction costs.

The division of project costs into shares (Federal, State and local) was based on the following:

- Federal and State grants (75% and 15%, respectively) will be made for major portions of the alternative; interceptors, pump stations, force mains, treatment facilities; but not collector sewers (except in Foxon) and implementation costs.

-- The local share of project costs will be recovered from both users and the general taxpayer; users will pay 40% of the costs, general taxpayers will pay 60% of the costs.

-- An annual cost of $81,100 is equivalent to 1 mill on the tax rate.

-- Users will be allowed to pay their share of the local cost over twenty years.

-- Users will pay for operation and maintenance of collection and treatment facilities.

## C-5 Present Worth

The various alternatives considered herein have different initial costs (capital costs) and different annual costs. For the purpose of comparison, the capital and annual costs of an alternative are combined to produce a total present worth cost for the alternative. The total present worth cost of an alternative is a number that takes into account the cost of money (as determined by the interest rate used). Therefore, an annual cost of $1,000 per year for twenty years has a present worth of $11,000, rather than $20,000. Another factor used in the present worth analysis is salvage value. This factor represents the value of an item at the end of the study period (in this case, 20 years). The salvage value of an item is deducted from the total present worth as a credit.

## C-6 The Tables

Tables C-2 through C-6 deal with the present worth cost of alternatives for Section "B". Table C-7 is a summary of these present worth costs. Tables C-8 through C-10 present a comparison of individual costs for community systems and limited sewering in the Foxon area. Tables C-11 through C-14 deal with the present worth cost of alternatives for Section "C". Table C-15 is a summary of these present worth costs. Tables C-16 through C-20 present the individual costs for the alternatives in Section "C". Finally, Tables C-21 through C-24 contain the analysis of a specialized pressure sewer concept for the Green Acres area.

## C-7 The Analysis Process

In Tables C-2 through C-4, three basic concepts to solve the wastewater problems in the Foxon area (Area B) were developed. They were:

- -- Community sewer systems discharging to leachfields in their specific problem areas.
- -- A limited sewer system servicing only the problem areas.
- -- An area-wide sewer system servicing all of the area.

In each instance, where sewer service was not provided, estimates were developed for the costs incurred by homeowners for septic system use over the 20 year planning period. This was done in accordance with the assumptions of Section C-4. The community sewer system had the lowest present worth cost of the three approaches.

The analysis in Tables C-5 and C-6 was developed as a refinement to the approach of solving the area's problems. Because of the necessity to install many individual pumps in Green Acres and the proximity to the East Haven sewer system, the least cost alternative was disaggregated to consider the question of a community system for areas such as Miller/Grant Roads and a limited sewer for Arthur Court.

The summary of the present worth analysis is shown in Table C-7. The least cost approach to solving the Foxon area problems consists of a limited sewering of the Arthur Court area discharging to East Haven and the use of community leaching fields in the Miller, Grant, and Jerz Lane areas.

Though not a formal part of the present worth analysis upon which cost-effective analysis is defined, the computations in Tables C-8 through C-10 show the anticipated costs to individuals that are associated with the various alternatives. While the cost to the individual in the Arthur Court area ($734 first year, $134 each year thereafter) appear reasonable, the other costs are quite high. These factors are legitimate areas of concern in the impact evaluations and conclusions and were considered there.

In Tables C-11 through C-14, the entire C-2 and C-3 areas are considered as a unit. (C-1 has already been approved for sewering.) Costs were developed for:

- -- continued on-site septic system use throughout the area.
- -- a community sewer in the White Hollow area and a limited sewer in Green Acres.
- -- a community sewer in the White Hollow area and a limited sewer in Green Acres extending to Surrey Drive.
- -- a limited sewer to all present problem areas.
- -- a limited sewer to Green Acres and Surrey Drive, on-site elsewhere.
- -- a limited sewer to Green Acres only, on-site elsewhere.
- -- area-wide sewering.

The total present worth costs of these alternatives is presented in Table C-15. From this Table, it is seen that the least cost alternative would be to remain with on-site septic system use in the whole area. For those with no history of problems, such an approach seems desirable. Table C-16 was developed to show the real costs, regardless who must pay them, of on-site use. The basic assumption is that the individual runs the risk (40% chance) of having to have major repairs to his system in the 20 year planning period, as well as paying $30 annually for operational maintenance. The implication is, while annual costs are low, the individual runs the risk of having to pay a large amount solely by himself.

The basis of Alternative 1 in Table C-16 is the cumulative effect of this risk throughout the area plus the rehabilitation of known problems through a community sponsored and grant-assisted program. The effects of grants upon the individual whose system must be repaired are shown in Table C-16 as an initial first year cost of $800.

Because it is not known whether on-site rehabilitation is actually feasible on a site-by-site basis (additional site specific engineering is required) and because the willingness of residents and the community to pursue this program are unknown, additional options were explored in terms of total and individual costs.

In Tables C-16 through C-20, the individual costs for the major alternatives were computed. From these Tables, it is apparent that no solution would be as inexpensive for the homeowner as is possible in the Foxon area. This is due basically to assumptions of the funding that will be available for various elements of the alternatives under the present State priority system. The basic difference between the costs to the individual in areas C-2 and C-3 compared to costs incurred elsewhere in Town, is the cost of lateral street sewers which are assumed to be a local expense here. As a result, the individual expense for all options is higher.

Because of the high individual costs that were calculated for the limited sewer for the Green Acres area (Table C-20), several variations were developed in an effort to see if the cost might be lowered. In Table C-20, the size of the system was reduced to serve only the Green Acres area. In Table C-21 through C-24, a concept for a small diameter pressure sewer was developed. Two sets of costs were developed based on different assumptions of funding.

The effect of the availability of grants is considerable. It should be pointed out that variations in conventional sewers are uncommon. Consequently, experience in applying assumptions on the priority which will be assigned to a project is limited. In Green Acres, the assumption that every element from the house pump on is eligible for funding significantly reduces the individual costs. In White Hollow, on the other hand, the use of a gravity system meant that the lateral sewers, as is the case in conventional sewers, were not considered likely to be founded and, consequently, the individual cost is considerable.

Definitive answers on the funding of unique or innovative systems will emerge as towns apply to the State for funding. In light of the high costs of conventional sewer systems, towns should not be dissuaded from developing the necessary engineering information to support applications that may prove less costly to everyone.

### TABLE C-2
### ALTERNATIVE 2 - SECTION "B"
### COMMUNITY LEACHING FIELDS
### PRESENT WORTH COST

| ITEM | QUANTITY | UNIT COST | ANNUAL COST | PRESENT WORTH COST | SALVAGE VALUE |
|---|---|---|---|---|---|
| Grinder Pumps | 153 | $ 1,750 | | 267,750 | 0 |
| House Connections | 209 | 600 | | 125,400 | 20,900 |
| Initial Repairs | 10 | 2,000 | | 20,000 | 1,200 |
| New Septic Tanks | 108 | 500 | | 54,000 | 3,200 |
| COLLECTOR SEWERS | | | | | |
| Small Diameter | 4,316' | 40 | | 172,640 | 28,800 |
| Pressure | 7,520' | 15 | | 112,800 | 18,800 |
| Interceptors (Pressure) | 2,900' | 20 | | 58,000 | 9,700 |
| Leaching Fields | 209,000 s.f. | 2.50 | | 522,500 | - |
| Land | 9.3 ac. | 10,000 | | 93,000 | 25,780 |
| Ejector Stations | 2 | | | 115,000 | - |
| Force Main | 1,900' | 25 | | 47,500 | 7,900 |
| IMPLEMENTATION COSTS | | | | 372,000 | - |
| Operation and Maintenance | | | | | |
| Grinder Pumps | 153 | 60 | 9,180 | | |
| Pump Outs | 833 | 30 | 24,990 | | |
| Repairs | 12 | 2,000 | 24,000 | | |
| Ejector Stations | 2 | 5,000 | 10,000 | | |
| Leaching Fields | | | 14,000 | | |
| TOTAL | | | $ 82,170 | 896,490 | (116,280) |
| TOTAL PRESENT WORTH COST | | | | $2,740,800 | |

## TABLE C-3
## ALTERNATIVE 3-SECTION "B"
## LIMITED SEWERING
## PRESENT WORTH COST

| ITEM | QUANTITY | UNIT COST | ANNUAL COST | PRESENT WORTH COST | SALVAGE VALUE |
|---|---|---|---|---|---|
| House Connection | 209 | 600 | | 125,400 | 20,900 |
| Rehabilitations | 10 | 2,000 | | 20,000 | 1,200 |
| CONVENTIONAL SEWERS | | | | | |
| Collectors | 12,340' | 55 | | 678,700 | 113,350 |
| Interceptors | 27,460' | 70 | | 1,922,200 | 321,000 |
| IMPLEMENTATION COSTS | | | | 780,300 | - |
| OPERATION & MAINTENANCE | | | | | |
| Pump Outs | 624 | 30 | 18,720 | | |
| Sewer System | 209 | 40 | 8,360 | | |
| Annual Repairs | 12 | 2,000 | 24,000 | | |
| TOTAL | | | 51,080 | 557,250 | (456,450) |
| TOTAL PRESENT WORTH COST | | | | | $3,627,400 |

# TABLE C-4
# ALTERNATIVE 4- SECTION "B"
# AREAWIDE SEWERING
# PRESENT WORTH COST

| ITEM | QUANTITY | UNIT COST | ANNUAL COST | PRESENT WORTH COST | SALVAGE VALUE |
|---|---|---|---|---|---|
| House Connections | 833 | $ 600 | | $ 499,800 | $ 83,470 |
| CONVENTIONAL SEWERS | | | | | |
| Collectors | 94,000 | 55 | | 5,170,000 | 863,400 |
| Interceptors | 27,460 | 70 | | 1,922,200 | 321,000 |
| IMPLEMENTATION COSTS | | | | 2,127,600 | |
| OPERATION & MAINTENANCE | | | | | |
| Sewer Use | 833 | 40 | 33,320 | 363,520 | (1,267,870) |
| TOTAL PRESENT WORTH COST | | | | $8,815,250 | |

## TABLE C-5
## ALTERNATIVE 5 - SECTION "B"
## LIMITED SEWER IN FOXON AND COMMUNITY SYSTEMS IN NORTHERN SECTION
## PRESENT WORTH COST

| ITEM | QUANTITY | UNIT COST | ANNUAL COST | PRESENT WORTH COST | SALVAGE VALUE |
|---|---|---|---|---|---|
| House Connections | 209 | $ 600 | | 125,400 | 20,900 |
| Initial Repairs | 10 | 2,000 | | 20,000 | 1,200 |
| CONVENTIONAL SEWERS | | | | | |
| Collectors | 7,160' | 55 | | 393,800 | 65,750 |
| Interceptors | 8,760' | 65 | | 569,400 | 95,050 |
| SMALL DIAMETER SEWERS | | | | | |
| Collectors | 4,316' | 40 | | 172,640 | 28,800 |
| Ejector Stations | 2 | | | 115,000 | - |
| Leaching Fields | 56,000 s.f. | 2.5 | | 140,000 | - |
| Land | 3 ac | 10,000 | | 30,000 | 8,300 |
| Force Main | 1,900' | 25 | | 47,500 | 7,900 |
| IMPLEMENTATION COSTS | | | | 440,500 | |
| OPERATION AND MAINTENANCE | | | | | |
| Pump Outs | 680 | 30 | 20,400 | | |
| Repairs | 12 | 2,000 | 24,000 | | |
| Ejector Stations | 2 | 5,000 | 10,000 | | |
| Leaching Fields | 2 | 3,500 | 7,000 | | |
| Sewage Treatment | 153 | 40 | 6,120 | | |
| | | | 67,520 | 736,660 | (227,900) |
| TOTAL PRESENT WORTH COST | | | | $2,563,000 | |

# TABLE C-6
# ISOLATION OF COSTS
# COMMUNITY LEACHING FIELDS IN NORTHERN SECTION B
# PRESENT WORTH COSTS

| ITEM | QUANTITY | UNIT COST | ANNUAL COST | PRESENT WORTH COST | SALVAGE VALUE |
|---|---|---|---|---|---|
| House Connections | 56 | $ 600 | | $ 33,600 | $ 5,600 |
| Initial Repairs | 10 | 2,000 | | 20,000 | 1,200 |
| COLLECTOR SEWERS | 4,316 | 40 | | 172,640 | 28,800 |
| Force Mains | 1,900 | 25 | | 47,500 | 7,900 |
| Ejector Stations | 2 | | | 115,000 | - |
| Leaching Fields | 56,000 s.f. | 2.50 | | 140,000 | - |
| Land | 3 ac. | 10,000 | | 30,000 | 8,300 |
| IMPLEMENTATION COSTS | | | | 151,560 | |
| OPERATION AND MAINTENANCE | | | | | |
| Pump Outs | 680 | 30 | 20,400 | | |
| Repairs | 12 | 2,000 | 24,000 | | |
| Ejector Stations | 2 | 5,000 | 10,000 | | |
| Leaching Fields | 2 | 3,500 | 7,000 | | |
| | | | 61,400 | 669,900 | (51,800) |
| TOTAL PRESENT WORTH COST | | | | $1,328,400 | |

## TABLE C-7
## SUMMARY OF COST ESTIMATES
## SECTION "B"

| ALTERNATIVE | DESCRIPTION | PRESENT WORTH COST |
|---|---|---|
| 1 | Continued reliance on on-site disposal. | Not Feasible |
| 2 | Community leaching fields for problem areas, small diameter gravity systems for Miller/Grant & Jerz. Small diameter pressure systems for Foxon. | $2,740,800 |
| 3 | Limited sewer system to serve only problem areas discharge to East Haven system. | $3,627,400 |
| 4. | Areawide sewer system discharge to East Haven. | $8,815,250 |
| 5. | Limited sewer system in Foxon-Community leaching systems for Miller/Grant & Jerz. | $2,563,000 |
| 5A. | Community leaching system for Foxon. | $1,412,400 |
| 5B. | Limited serve system for Foxon. | $1,234,600 |

## TABLE C-8
## FOXON AREA - 153 USERS
## COMPARISON OF USES COST
## COMMUNITY SYSTEMS VERSUS LIMITED SEWERS

| ITEM | COMMUNITY SYSTEMS | LIMITED SEWERS |
|---|---|---|
| Private Capital | | |
| House Connections | 92,000 | 92,000 |
| MUNICIPAL CAPITAL | | |
| New Septic Tanks | 54,000 | |
| Grinder Pumps | 267,750 | |
| Collector Sewers | 112,800 | 393,800 |
| Interceptor | 58,000 | 569,400 |
| Leaching Fields | 446,000 | - |
| Implementation | 281,630 | 288,960 |
| TOTAL | 1,220,180 | 1,252,160 |
| FEDERAL & STATE GRANTS | 453,600 | 866,880 |
| LOCAL SHARES | 766,580 | 385,280 |
| Amount to Taxes | 459,948 | 231,168 |
| Tax Increase | 0.52 | 0.26 |
| Lien on Users | 306,632 | 154,112 |
| Annual Cost | 28,105 | 14,125 |
| OPERATION & MAINTENANCE | 20,770 | 6,120 |
| ANNUAL USER COST | | |
| First Year | 920 | 734 |
| Each Year Thereafter | 320 | 134 |

## TABLE C-9

## INDIVIDUAL COST ESTIMATES
## COMMUNITY SYSTEMS - SECTION "B"
## MILLER RD & GRANT RD - JERZ LANE

| ITEM | MILLER/GRANT | JERZ | TOTAL |
|---|---|---|---|
| Units Served | 40 | 16 | 56 |
| House Connections | 24,000 | 9,600 | 33,600 |
| Collectors | 121,440 | 51,200 | 172,640 |
| Force Mains | 10,000 | 37,500 | 47,500 |
| Ejector | 60,000 | 55,000 | 115,000 |
| Leaching Field | 100,000 | 40,000 | 140,000 |
| Land | 20,000 | 10,000 | 30,000 |
| Implementation | 93,440 | 58,120 | 151,560 |
| TOTAL | 404,880 | 251,820 | 656,700 |
| State & Federal Funds | 171,000 | 128,250 | 299,250 |
| Local Share | 233,880 | 123,570 | 357,450 |
| Amount to Taxas | 140,328 | 74,142 | 214,470 |
| Tax Increase | 0.16 | 0.09 | 0.25 |
| Lien on Users | 93,552 | 49,428 | 142,980 |
| Annual Cost | 8,575 | 4,530 | 13,105 |
| O & M Cost | 9,700 | 8,980 | 18,680 |
| ANNUAL USER COST First Year | 1,057 | 1,444 | 1,167 |
| Eash Year Thereafter | 457 | 844 | 567 |

C-16

# TABLE C-10
# INDIVIDUAL COST ESTIMATES
# ALTERNATIVE 3 vs. ALTERNATIVE 4
# SECTION "B"

| ITEM | ALTERNATIVE 3 | ALTERNATIVE 4 |
|---|---|---|
| Units Served | 209 | 833 |
| House Connections | 125,400 | 499,800 |
| Collectors | 678,700 | 5,170,000 |
| Interceptors | 1,922,200 | 1,922,200 |
| Implementation | 780,300 | 2,127,600 |
| TOTAL | 3,381,200 | 9,219,800 |
| Federal & State Grants | 1,729,980 | 1,729,980 |
| Local Share | 1,651,220 | 7,489,820 |
| Amount to Taxes | 990,732 | 4,493,892 |
| Tax Increase | 1.12 | 5.08 |
| Lien on Users | 660,488 | 2,995,928 |
| Annual Cost | 60,540 | 274,600 |
| O&M Cost | 8,360 | 33,320 |
| ANNUAL USER COST First Year | 929 | 969 |
| Each Year Thereafter | 329 | 369 |

### TABLE C-11
### ALTERNATIVE 1 - SECTION "C"
### ON-SITE DISPOSAL
### PRESENT WORTH COST
### 1179 UNITS SERVED

| ITEM | QUANTITY | UNIT COST | ANNUAL COST | PRESENT WORTH COST | SALVAGE VALUE |
|---|---|---|---|---|---|
| Rehabilitations | 55 | 2000 | | 110,000 | (6,600) |
| OPERATION & MAINTENANCE | | | | | |
| Pump Outs | 1179 | 30 | 35,370 | | |
| Repairs | 24 | 2000 | 48,000 | | |
| TOTAL | | | 83,370 | 909,600 | |
| TOTAL PRESENT WORTH COST | | | | $1,013,000 | |

## TABLE C-11
## ALTERNATIVE 2A - SECTION "C"
## COMMUNITY LEACHING SYSTEMS IN WHITE HOLLOW
## LIMITED SEWERS FOR GREEN ACRES
## PRESENT WORTH COST

| ITEM | QUANTITY | UNIT COST | ANNUAL COST | PRESENT WORTH COST | SALVAGE VALUE |
|---|---|---|---|---|---|
| House Connections | 197 | 600 | | 118,200 | 19,700 |
| Rehabilitations | 25 | 2000 | | 50,000 | 3,000 |
| COLLECTOR SEWERS | | | | | |
| Conventional | 6000' | 55 | | 330,000 | 55,110 |
| Small Diameter | 14400' | 40 | | 576,000 | 96,190 |
| INTERCEPTORS | | | | | |
| Conventionsl | - | | | | |
| Small Diameter | 4150' | 45 | | 186,750 | 31,000 |
| LEACHING FIELD | 154000 s.f. | 2.50 | | 385,000 | - |
| Land | 5.5 ac. | 10000 | | 55,000 | 15,250 |
| IMPLEMENTATION COSTS | | | | | |
| OPERATION & MAINTENANCE | | | | | |
| Pump Outs | 1136 | 30 | 34,080 | | |
| Leaching Fields | | | 7,000 | | |
| Treatment | 43 | 40 | 1,720 | | |
| Repairs | 18 | 2000 | 36,000 | 859,700 | (220,250) |
| TOTAL PRESENT WORTH COST | | | | $2,800,250 | |

## TABLE C-12
## ALTERNATIVE 3 - SECTION "C"
## LIMITED SEWERING
## PRESENT WORTH COST

| ITEM | QUANTITY | UNIT COST | ANNUAL COST | PRESENT WORTH COST | SALVAGE VALUE |
|---|---|---|---|---|---|
| House Connections | 204 | $ 600 | | 122,400 | 20,450 |
| Rehabilitations | 20 | 2000 | | 40,000 | 2,400 |
| Collector Sewers | 20,150' | 55 | | 1,108,250 | 185,000 |
| Interceptors | 21,500 | 70 | | 1,505,000 | 253,000 |
| Pump Stations | 1 | 150,000 | | 150,000 | 18,000 |
| Force Main | 1,750 | 45 | | 78,750 | |
| IMPLEMENTATION COSTS | | | | 852,600 | |
| OPERATION AND MAINTENANCE | | | | | |
| Pump Outs | 975 | 30 | 29,250 | | |
| Annual Repairs | 18 | 2,000 | 36,000 | | |
| Pump Station | 1 | 15,000 | 15,000 | | |
| Treatment | 204 | 40 | 8,160 | | |
| | | | 88,410 | 964,500 | (491,900) |
| | | | | 4,329,650 | |
| TOTAL PRESENT WORTH COST | | | | | |

# TABLE C-13
## ALTERNATIVE 2B- SECTION "C"
## COMMUNITY LEACHING SYSTEMS IN WHITE HOLLOW
## LIMITED SEWERS FOR GREEN ACRES AND SURREY
## PRESENT WORTH COST

| ITEM | QUANTITY | UNIT COST | ANNUAL COST | PRESENT WORTH COST | SALVAGE VALUE |
|---|---|---|---|---|---|
| House Connections | 204 | $ 600 | | 122,400 | 20,450 |
| Rehabilitations | 20 | 2,000 | | 40,000 | 2,400 |
| COLLECTOR SEWERS | | | | | |
| Conventional | 4000' | 55 | | 269,500 | 45,000 |
| Small Diameter | 14400 | 40 | | 576,000 | 96,190 |
| INTERCEPTORS | | | | | |
| Conventional | 3450 | 65 | | 224,250 | 37,225 |
| Small Diameter | 4150 | 45 | | 186,750 | 31,000 |
| Leaching Fields | 154000 | 2.50 | | 385,000 | - |
| Land | 5.5 | 10,000 | | 55,000 | 15,250 |
| IMPLEMENTATION COSTS | | | | 508,950 | |
| OPERATION AND MAINTENANCE | | | | | |
| Pump Outs | 1129 | 30 | 33,870 | | |
| Leaching Fields | | | 7,000 | | |
| Treatment | 50 | 40 | 2,000 | | |
| Repairs | 18 | 2,000 | 36,000 | | |
| | | | 78,870 | 860,475 | (247,515) |
| TOTAL PRESENT WORTH COST | | | | $2,980,810 | |

## TABLE C-13A
## ALTERNATIVE 3A - SECTION "C"
## LIMITED SEWERS - GREEN ACRES & SURREY
## PRESENT WORTH COST

| ITEM | QUANTITY | UNIT COST | ANNUAL COST | PRESENT WORTH COST | SALVAGE VALUE |
|---|---|---|---|---|---|
| LIMITED SEWERING | | | | | |
| House Connections | 50 | $ 600 | | $ 30,000 | $ 6,000 |
| Collector Sewers | 4900' | 55 | | 269,500 | 45,000 |
| Interceptors | 3450' | 65 | | 224,250 | 37,225 |
| IMPLEMENTATION COSTS | | | | 148,125 | |
| OPERATION & MAINTENANCE | | | | | |
| Treatment | 50 | 40 | $ 2,000 | 21,825 | (88,225) |
| PRESENT WORTH COST | | | | $605,475 | |
| ON-SITE DISPOSAL | | | | | |
| Rehabilitations | 30 | 2000 | | 60,000 | 3,600 |
| OPERATION & MAINTENANCE | | | | | |
| Pump Outs | 1129 | 30 | 33,870 | | |
| Repairs | 18 | 2000 | 36,000 | | |
| | | | 69,870 | 762,275 | (3,600) |
| PRESENT WORTH COST | | | | $818,675 | |
| TOTAL PRESENT WORTH COST | | | | $1,424,150 | |

C-22

# TABLE C-13B
## ALTERNATIVE 3B - SECTION "C"
## LIMITED SEWERS - GREEN ACRES ONLY
## PRESENT WORTH COST

| ITEM | QUANTITY | UNIT COST | ANNUAL COST | PRESENT WORTH COST | SALVAGE VALUE |
|---|---|---|---|---|---|
| LIMITED SEWERING | | | | | |
| House Connections | 43 | $ 600 | | $ 25,800 | $ 5,160 |
| Collector Sewers | 6,000' | 55 | | 330,000 | 54,790 |
| Implementation Costs | | | | 99,000 | |
| OPERATION AND MAINTENANCE | | | | | |
| Treatment | 43 | 40 | 1,720 | 18,750 | (59,950 |
| PRESENT WORTH COST | | | | $413,600 | |
| ON-SITE DISPOSAL | | | | | |
| Rehabilitations | 35 | 2,000 | | 70,000 | 4,200 |
| OPERATION & MAINTENANCE | | | | | |
| Pump Outs | 1,136 | 30 | 34,080 | | |
| Repairs | 18 | 2,000 | 36,000 | | |
| | | | 70,080 | 164,600 | $4,200) |
| PRESENT WORTH COST | | | | 830,400 | |
| TOTAL PRESENT WORTH COST | | | | $1,244,000 | |

## TABLE C-14
## ALTERNATIVE 4- SECTION "C"
## AREAWIDE SEWERING
## PRESENT WORTH COST

| ITEM | QUANTITY | UNIT COST | ANNUAL COST | PRESENT WORTH COST | SALVAGE VALUE |
|---|---|---|---|---|---|
| House Connections | 1,179 | 600 | | 707,400 | 118,000 |
| Collector Sewers | 89,200 | 55 | | 4,906,000 | 819,000 |
| Interceptor | 23,000 | 70 | | 1,610,000 | 269,000 |
| Pump Station | 1 | 200,000 | | 200,000 | 18,000 |
| Force Main | 1,750 | 50 | | 87,500 | 14,600 |
| IMPLEMENTATION COSTS | | | | 2,041,000 | |
| OPERATION AND MAINTENANCE | | | | | |
| Pump Station | 1 | 17,500 | 17,500 | | |
| Treatment | 1,179 | 40 | 47,160 | | |
| | | | 64,660 | 705,450 | (1,238,600) |
| TOTAL PRESENT WORTH COST | | | | $9,018,750 | |

C-24

# TABLE C-15
# SUMMARY OF COST ESTIMATES
# SECTION "C"

| ALTERNATIVE | DESCRIPTION | TOTAL PRESENT WORTH COST |
|---|---|---|
| 1 | Continued reliance on on-site disposal. | $1,013,000 |
| 2A | Community leaching systems for the White Hollow Area, limited sewers for Green Acres and on-site for the rest of the area. | $2,800,250 |
| 2B | Community leaching systems for the White Hollow Area, limited sewering of Green Acres and Surrey Drive and on-site for the rest of the area. | $2,980,810 |
| 3 | Limited sewer system for all problem areas, on-site to the rest of the area. | $4,329,650 |
| 3A | Limited sewer system for Green Acres & Surrey Drive on-site for the rest. | $1,424,150 |
| 3B | Limited sewers for Green Acres on-site for the rest | 1,244,000 |
| 4 | Areawide sewer system | 9,018,750 |

### TABLE C-16
### ON-SITE DISPOSAL
### INDIVIDUAL COSTS

| ITEM | COST |
|---|---|
| Initial Repair | $2,000 |
| Implementation Cost | 600 |
| Total Cost | 2,600 |
| Federal & State Grants | 1,800 |
| Local Cost | 800 |
| ANNUAL MAINTENANCE | |
| Biennial Pumping At $60 per pump out | 30 |
| Cost of Furnace Repair | 2,000 |
| COST TO USER | |
| If Initial Repair Required | 800 |
| ANNUAL COST OF MAINTENANCE | 30 |
| IF INITIAL REPAIR NOT REQUIRED | |
| Annual Cost of Maintenance | 30 |
| 40% chance of repair during 20 year period at | 2,000 |

C-26

# TABLE C-17
# COMMUNITY LEACHING SYSTEMS
# WHITE HOLLOW AREA
# INDIVIDUAL COSTS

154 UNITS

| ITEM | COST |
|---|---|
| PRIVATE CAPITAL | |
| House Connections | 92,400 |
| MUNICIPAL CAPITAL | |
| Collector Sewers | 576,000 |
| Interceptors | 186,750 |
| Leaching System | 440,000 |
| Implementation | 360,850 |
| TOTAL | $ 1,563,600 |
| FEDERAL & STATE GRANTS | 564,075 |
| LOCAL SHARE | 999,525 |
| Amount to Taxes | 599,715 |
| Tax Rate Increase | 0.68 |
| Lien on Users | 399,810 |
| Annual Cost over 20 years | 36,646 |
| OPERATION & MAINTENANCE | 11,620 |
| COST TO USERS | |
| First Year Cost | 913 |
| Annual Cost Thereafter | 313 |

## TABLE C-18
## INDIVIDUAL COSTS
## LIMITED SEWERING - SECTION "C"
## ALL PROBLEM AREAS
## 241 UNITS

| ITEM | COST |
|---|---|
| PRIVATE CAPITAL | |
| House Connections | $ 144,600 |
| MUNICIPAL CAPITAL | |
| Collector Sewer | 1,108,250 |
| Interceptors | 1,505,000 |
| Pump Station | 150,000 |
| Force Main | 78,800 |
| Implementation | 852,600 |
| TOTAL | $3,694,650 |
| FEDERAL & STATE FUNDS | 1,560,420 |
| LOCAL SHARE | 2,134,230 |
| AMOUNT TO TAXES | 1,280,538 |
| Tax Rate Increase | 1.45 |
| Lien on Users | 853,692 |
| Annual Cost over 20 years | 78,248 |
| OPERATION & MAINTENANCE | 24,640 |
| NUMBER OF ABUTTERS | 241 |
| FIRST YEAR COST | 1,027 |
| ANNUAL COST THEREAFTER | 427 |

### TABLE C-19
### INDIVIDUAL COSTS
### LIMITED SEWERING - SECTION "C"
### GREEN ACRES & SURREY
### 84 UNITS

| ITEM | COST |
|---|---|
| PRIVATE CAPITAL | |
| House Connections | $ 50,400 |
| MUNICIPAL CAPITAL | |
| Collector Sewer | 269,500 |
| Interceptor | 224,250 |
| Implementation | 148,125 |
| TOTAL | $ 641,875 |
| FEDERAL & STATE FUNDS | 201,825 |
| LOCAL SHARE | 440,050 |
| AMOUNT TO TAXES | 264,030 |
| Tax Rate Increase | 0.30 |
| LIEN ON USERS | 176,020 |
| Annual Cost over 20 years | 16,134 |
| OPERATION & MAINTENANCE | 3,360 |
| NUMBER OF ABUTTERS | 84 |
| FIRST YEAR COST | 832 |
| ANNUAL COST THEREAFTER | 232 |

# TABLE C-20
# INDIVIDUAL COSTS
# LIMITED SEWERING - SECTION "C"
# GREEN ACRES ONLY
# 59 UNITS

| ITEM | COST |
|---|---|
| Private Capital | |
| House Connections | 35,400 |
| MUNICIPAL CAPITAL | |
| Collector Sewers | 330,000 |
| Implementation | 100,000 |
| TOTAL | 430,000 |
| FEDERAL & STATE FUNDS | - |
| LOCAL SHARE | 430,000 |
| AMOUNT TO TAXES | 258,000 |
| Tax Rate Increase | 0.30 |
| LIEN ON USERS | 172,000 |
| Annual Cost over 20 years | 15,766 |
| OPERATION & MAINTENANCE | 2,360 |
| NUMBER OF ABUTTERS | 59 |
| FIRST YEAR COST | 907 |
| ANNUAL COST THEREAFTER | 307 |

## TABLE C-21

## Pressure Sewer System for Green Acres

Costs of Estimate - Grinder pumps $1,750 installed
Collector pipes $15/L.F.
Interceptor pipe $20/L.F.
Pump replacement after 15 yrs.
Pump maintenance $60/yr/unit
Wastewater treatment $40/yr/unit

Units served:

| | |
|---|---|
| Green acres and surrey | - 50 |
| Green acres | 43 |

Pipe length:

| | |
|---|---|
| Green acres and surrey | 5600/3480' |
| Green acres | 3000'/3480' |

Present worth analysis @ over 20 years 6 5/8%

Individual Costs
EPA & State Funding for Pumps, Collectors and Mains.

On-site alternative - 10 initial repairs @ $2,000
Biennval pumping @ $60
Repair @ 2%/year @ $2,000

Initial Repairs 10 @ 2000 = 2,000

O&M
Pumping 25 @ 60 = 1,500
Repairs 1 @ 2,000 = 2,000
3,500 x 10.91 = 38,185
58,185

## SECTION C-22
## PRESSURE SEWER SYSTEM
## GREEN ACRES & SURREY
## PRESENT WORTH COST

| ITEM | QUANTITY | UNIT COST | PRESENT WORTH COST | SALVAGE VALUE |
|---|---|---|---|---|
| House Connections | 50 | 600 | 30,000 | 5,000 |
| Grinder Pumps | 50 | 1750 | 87,500 | - |
| Replacements @ 15 yrs. | 50 | 1750 | 33,425 | - |
| Collectors | 5600' | 15 | 84,000 | 13,940 |
| Mains | 3480' | 20 | 69,600 | 11,560 |
| Implementation | | | 82,355 | - |
| OPERATION & MAINTENANCE | | | | |
| Pumps | 50 | 60 | | |
| Treatment | 50 | 40 | | |
| | | 100 | 54,500 | (30,500) |
| TOTAL PRESENT WORTH COST | | | $410,930 | |

## PRESSURE SEWER SYSTEM
## GREEN ACRES ONLY
## PRESENT WORTH COST

| | | | | |
|---|---|---|---|---|
| House Connections | 43 | 600 | 25,800 | 4,280 |
| Grinder Pumps | 43 | 1750 | 75,250 | - |
| Replacements @ 15/yr | 43 | 1750 | 28,745 | - |
| Collectors | 3000' | 15 | 45,000 | 7,470 |
| Mains | 3480 | 20 | 69,600 | 11,560 |
| Implementation | | | 65,575 | |
| Operation & Maintenance | | | | |
| Pumps | 43 | 60 | | |
| Treatment | 43 | 40 | | |
| | | 100 | 46,910 | (23,310) |
| | | | 333,570 | |

# TABLE C-23
# INDIVIDUAL COSTS
# PRESSURE SEWER SYSTEM

| ITEM | GREEN ACRES | | GREEN ACRES AND SURREY | |
|---|---|---|---|---|
| | | W/O Funds | | W/O Funds |
| Units | 59 | | 84 | |
| Private Capital | 35,400 | | 50,400 | |
| System Implementation | 217,850 | | 300,600 | |
| | 65,355 | | 90,180 | |
| | 283,205 | | 390,780 | |
| Federal & State Funds | 196,065 | - | 270,540 | - |
| Local Share | 87,140 | 283,205 | 120,240 | 390,780 |
| Amount to Taxes | 52,284 | 169,923 | 72,144 | 234,468 |
| Tax Rate Increase | 0.06 | 0.20 | 0.08 | 0.27 |
| Lien on Users | 34,856 | 113,282 | 48,096 | 156,312 |
| Annual Cost over 20 years | 3,195 | 10,383 | 4,410 | 14,327 |
| Operation & Maintenance | 5,900 | 5,900 | 8,400 | 8,400 |
| First Year Cost | 754 | 876 | 753 | 870 |
| Annual Cost Thereafter | 154 | 276 | 153 | 270 |

# APPENDIX D

# DETERMINATION OF WASTEWATER NEEDS

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## TABLE OF CONTENTS

PAGE

D.1 Method of Evaluating Needs............. D-1

D.11 Reason for Investigating Sewerage Needs........................ D-1
D.12 Definition of Wastewater Problem Areas................................. D-1
D.13 Determination of Wastewater Disposal Problem Areas................. D-1
D.14 Determination of Water Quality Problem Areas.......................... D-2

D.2 Findings................................ D-2

D.21 Review of Previous Reports and Studies................................ D-2
D.22 Review of Soil Conditions.............. D-4
D.23 Public Workshop....................... D-11
D.24 Review of Local Records............... D-11
D.25 Questionnaire Survey.................. D-11
D.26 Field Surveys......................... D-14
D.27 Water Quality Analysis................ D-14

D.3 Analysis of Findings.................. D-15

D.31 Methodology........................... D-15
D.32 Frame of Reference.................... D-15
D.33 Analysis.............................. D-15
D.34 Conclusions........................... D-17

TABLE D-1 Summary of Responses D-11

## D.1 Method of Evaluating Needs

### D.11 Reason for Investigating Sewerage Needs

There are two primary reasons for investigating sewerage needs. One, a documentation of wastewater collection and treatment needs is required for Federal participation in funding of projects recommended in Facility Plans; public health and water quality problems must be clearly documented and directly attributable to the malfunctioning of existing on-site disposal systems. Two, common sense dictates that it is inappropriate to spend public or private funds to solve problems without first knowing their frequency, magnitude, and adverse environmental, social or economic impacts.

### D.12 Definition of Wastewater Problem Areas

Wastewater problem areas are limited to locations where on-lot systems are failing and/or pollution of either groundwater or surface water can be attributed to on-lot system. On-site failures occur when problems, such as slow plumbing drainage, system back-up, breakout of effluent, sewage odors and/or other obvious sub-standard performance is observed.

### D.13 Determination of Wastewater Disposal Problem Areas

A systematic program of data collection and evaluation has been used to determine wastewater disposal problem areas in North Branford. This program included:

- -- review of previous reports and studies of wastewater disposal problems,
- -- review of geological and agricultural reports to determine the suitability of North Branford soils for on-site disposal,

-- meetings with the public to determine its perception of wastewater problems,

-- interviews with local health officials and review/analysis of records to establish the performance of existing wastewater disposal systems,

-- a town-wide mailing of questionnaires designed to allow the public to comment on wastewater collection and treatment needs in their neighborhoods and for their houses, and

-- two separate problem area surveys, one by the EIS team engineers to evaluate the feasibility of on-site repairs in a general sense, another by the Connecticut Department of Environmental Protection field engineers to check for the existence of failing septic systems in identified problem areas.

### D.14 Determination of Water Quality Problem Areas

The major issue precipitating this EIS on wastewater collection in North Branford is the need for and effects of sewers in the Farm River Valley, a watershed for the New Haven Water Company. Data was collected and evaluated to determine whether existing wastewater disposal practices in the Town have an impact on water quality and to provide a baseline for the evaluation of alternatives. The data collection and evaluation program used is fully described in Appendix F of this document.

## D.2 Findings

### D.21 Review of Previous Reports and Studies

Two reports (or series of reports) are relevant to the determination of wastewater collection and treatment needs in North Branford: the first, "Sewerage Feasibility Study" North Branford, Connecticut, Flaherty-Giavara & Associates, 1971, and subsequent supporting and augmenting documents; the second, a series of studies conducted by the Connecticut Department of Health.

The Flaherty-Giavara report cited wastewater disposal problems in the following areas:

- Section A
- Section C-1 (a portion of the Town not included in the EIS study area)
- Brook Lane
- Jerz Lane
- Dorie Drive
- Miller Road and Grant Road
- Most of the Northeastern portion of Town

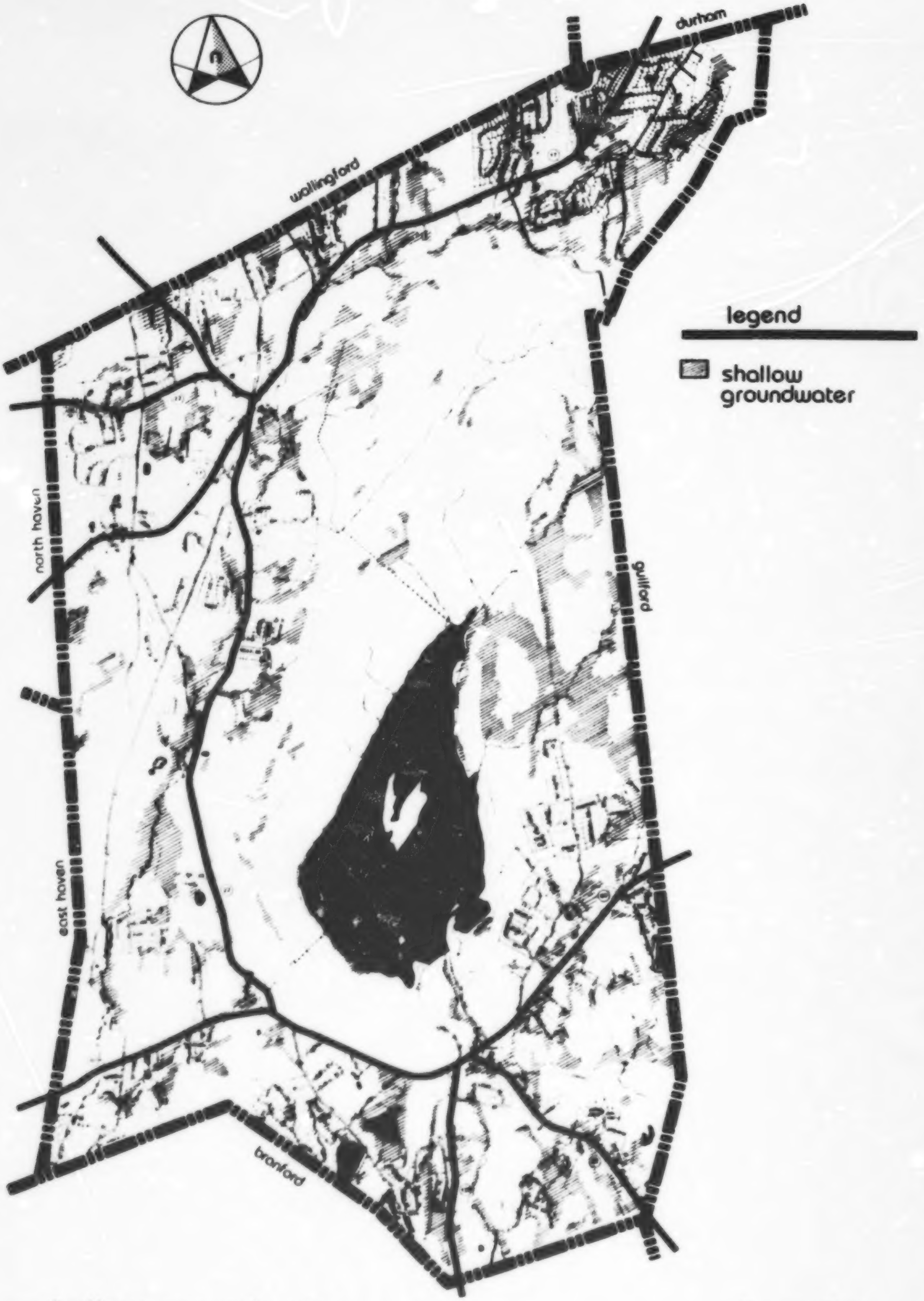
In subsequent reports, the Arthur Court and Green Acres neighborhoods were added to the list of problem areas. To remedy the wastewater disposal problems in these areas, a regional sewer system was proposed that would ultimately serve the entire Town. The initial phases of the project would result in capital investments from $8,000 to $11,000 per house served, not including tie-in costs, regional O & M costs, or capital recovery charges from the neighboring communities.

The East Shore District Health Department, with the help of Yale University Graduate students from the Medical School's Department of Epidemiology and Public Health, conducted a survey of 485 homes in the northeast section of North Branford during the Fall of 1974. They found that 37 of those surveyed had problems with their wastewater disposal system.

Between December 1974 and June 1975, the Connecticut Department of Health conducted a survey of water company watersheds in North Branford. The 37 homes in northeastern North Branford, which were found to have wastewater disposal problems, were surveyed - 11 of these had problems serious enough to warrant immediate correction, 8 had problems that warranted surveillance. The survey included 457 locations downstream of this area - 34 had problems that warranted correction (31 in North Branford), 40 had problems that warranted surveillance (37 in North Branford). By December 1977, according to the water company as reported by ESDHD, only 2 systems warranted correction and 9 systems warranted surveillance. The results of the sewer studies indicates that in general problems can be corrected. In certain areas, however, such as Arthur Court and Dorie Lane, the continued recording of septic system problems suggests basic limitations for the use of on-site systems.

## D.22 Review of Soil Conditions

The U.S. Department of Agriculture, Soil Conservation Service (SCS) has published information on soil conditions in North Branford. SCS classifies soil according to their limitations for on-site disposal (see Figure 4-2 in main text). These classifications are based on a combination of factors including: depth to groundwater, depth to bedrock, permeability and slope. Recognizing that these factors can be overcome individually, the SCS data was analyzed to separate the factors. Figures D-1, D-2, D-3 and D-4, respectively, present areas with: groundwater within 3 feet of the surface, bedrock within 2 feet of the surface, slow permeability, and steep slopes. These maps were then overlain to produce Figure D-5, which presents those areas where a combination of two limiting factors makes on-site disposal very difficult. A further mapping effort resulted in a map of areas with no limitations to on-site disposal (see Figure D-6) that is, areas with deep groundwater (greater than 3 feet), good permeability (50% chance of percolation rate between 10 and 20 minutes at the worst), slope less than 15% and bedrock depth greater than 10 feet. It is noted that disturbed areas (cut and fill areas, such as Green Acres and the Arthur Court neighborhoods) have unclassified soils.


durham
wallingford
legend
shallow groundwater
north haven
east haven
guilford
branford

**shallow groundwater** figureD-1

north branford wastewater treatment facilities

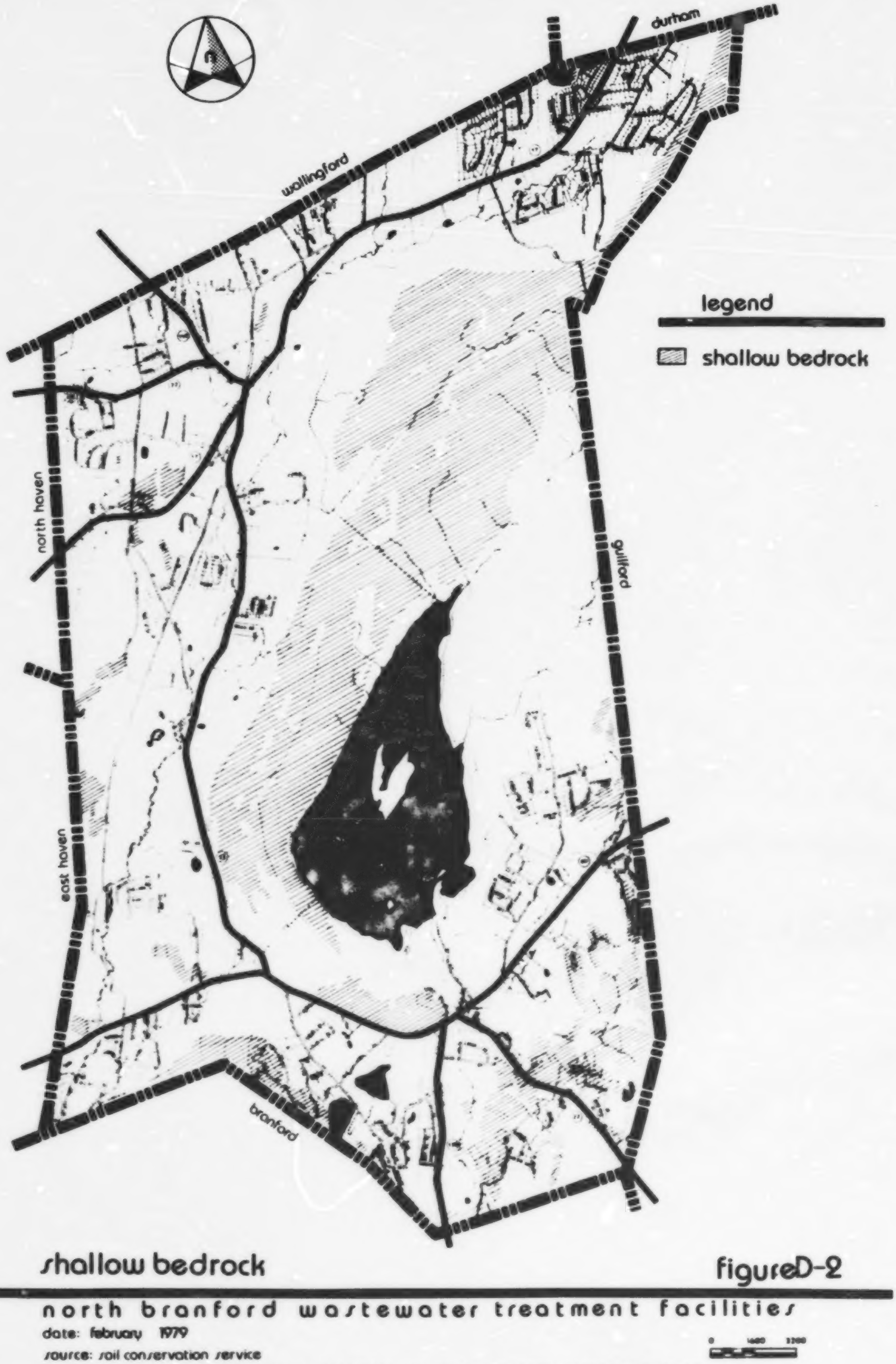
date: february 1979

source: soil conservation service

0 1650 3300

environmental impact statement ■ environmental protection agency

anderson-nichols & co., inc. technical consultant


durham
wallingford
north haven
east haven
branford
guilford
legend
▨ shallow bedrock

**shallow bedrock** **figureD-2**

**north branford wastewater treatment facilities**

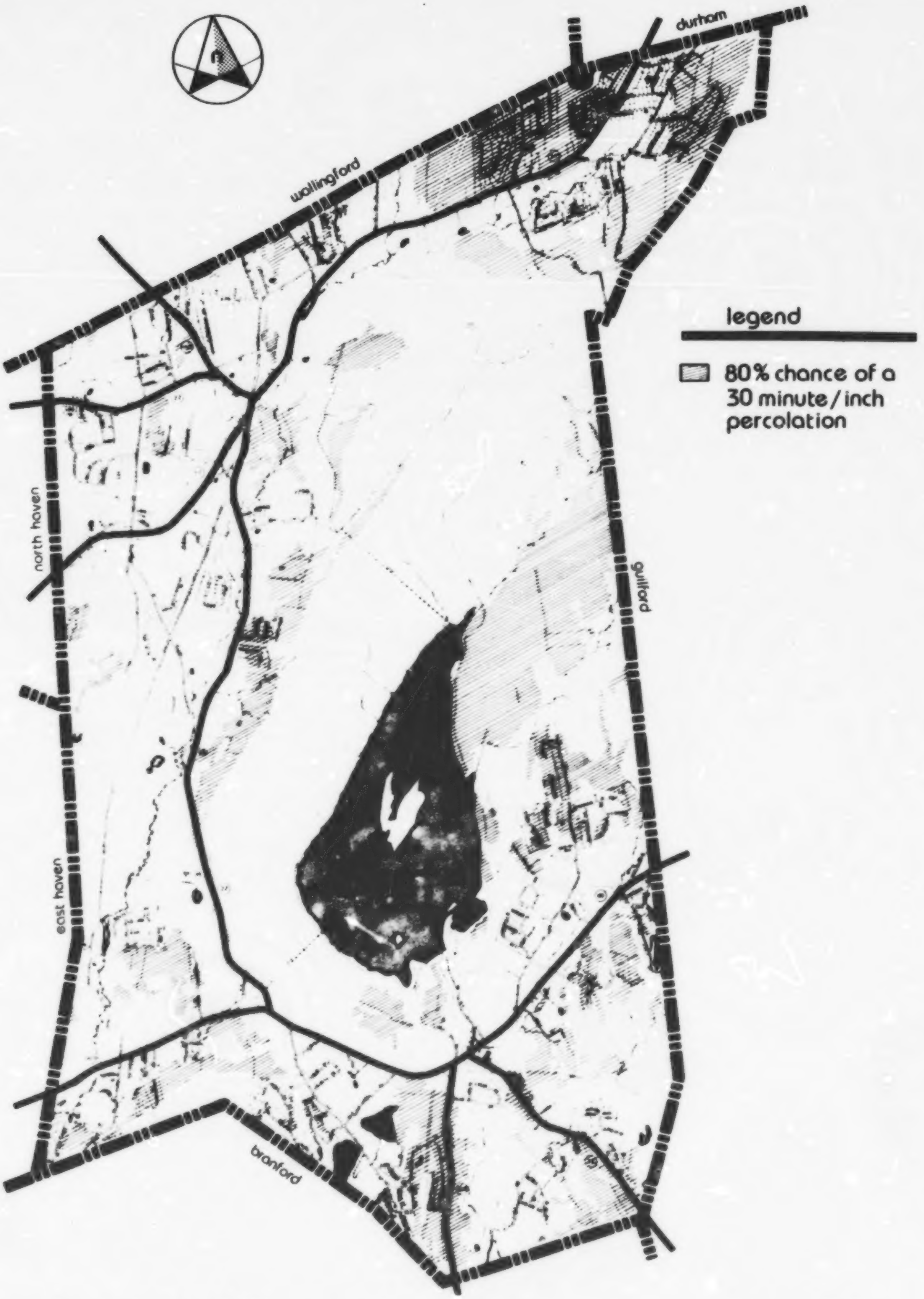
date: february 1979

source: soil conservation service

0 1600 3200

environmental impact statement ■ environmental protection agency

anderson-nichols & co., inc. technical consultant


durham
wallingford
north haven
east haven
guilford
branford
legend
▨ 80% chance of a 30 minute / inch percolation

slow permeability

figureD-3

north branford wastewater treatment facilities

date: february 1979

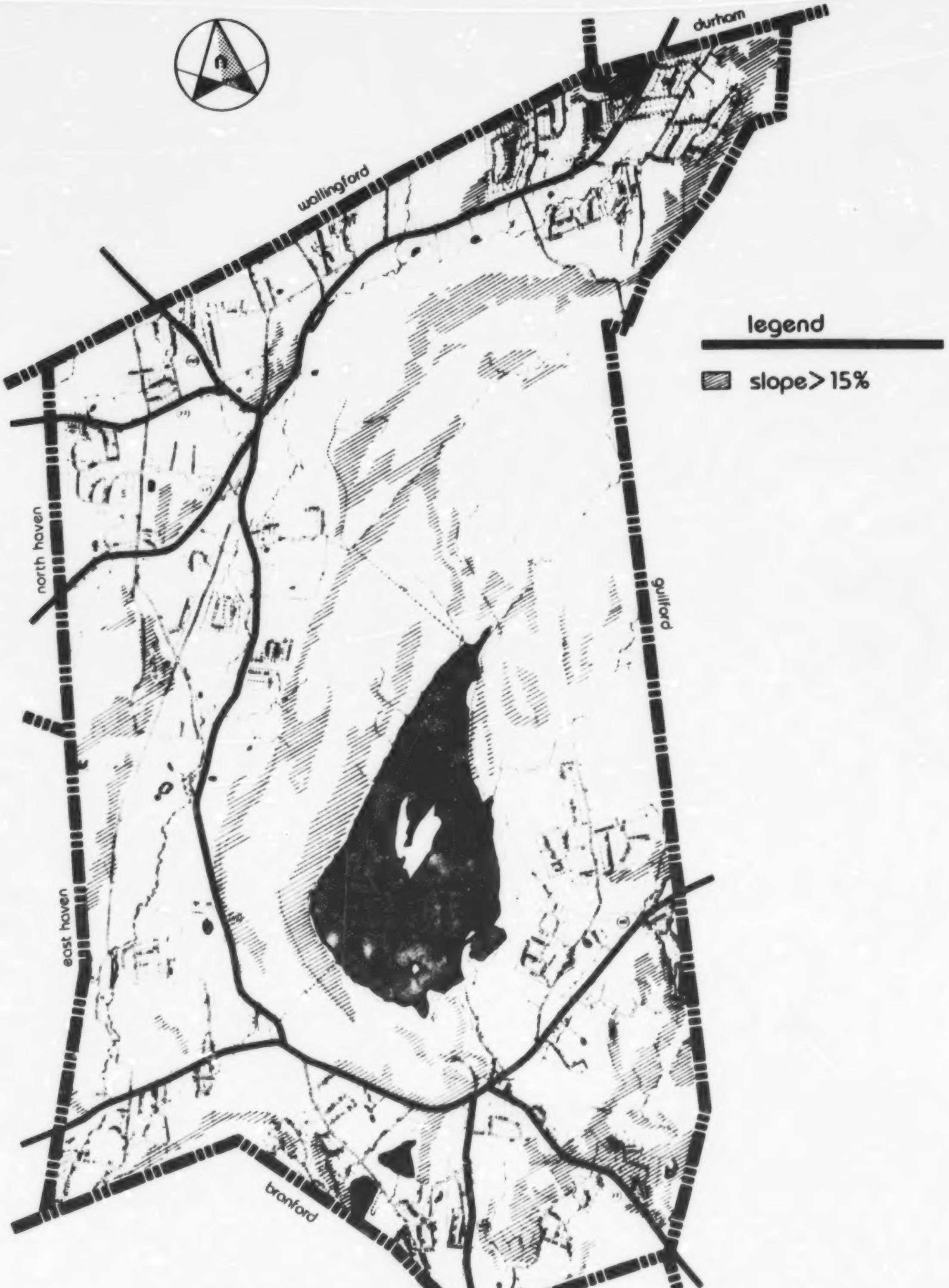
source: soil conservation service

0 1600 3200

environmental impact statement ■ environmental protection agency

anderson-nichols & co., inc.

technical consultant


durham
wallingford
north haven
guilford
east haven
branford
legend
▨ slope>15%

## steep slopes

figureD-4

north branford wastewater treatment facilities

date: february 1979

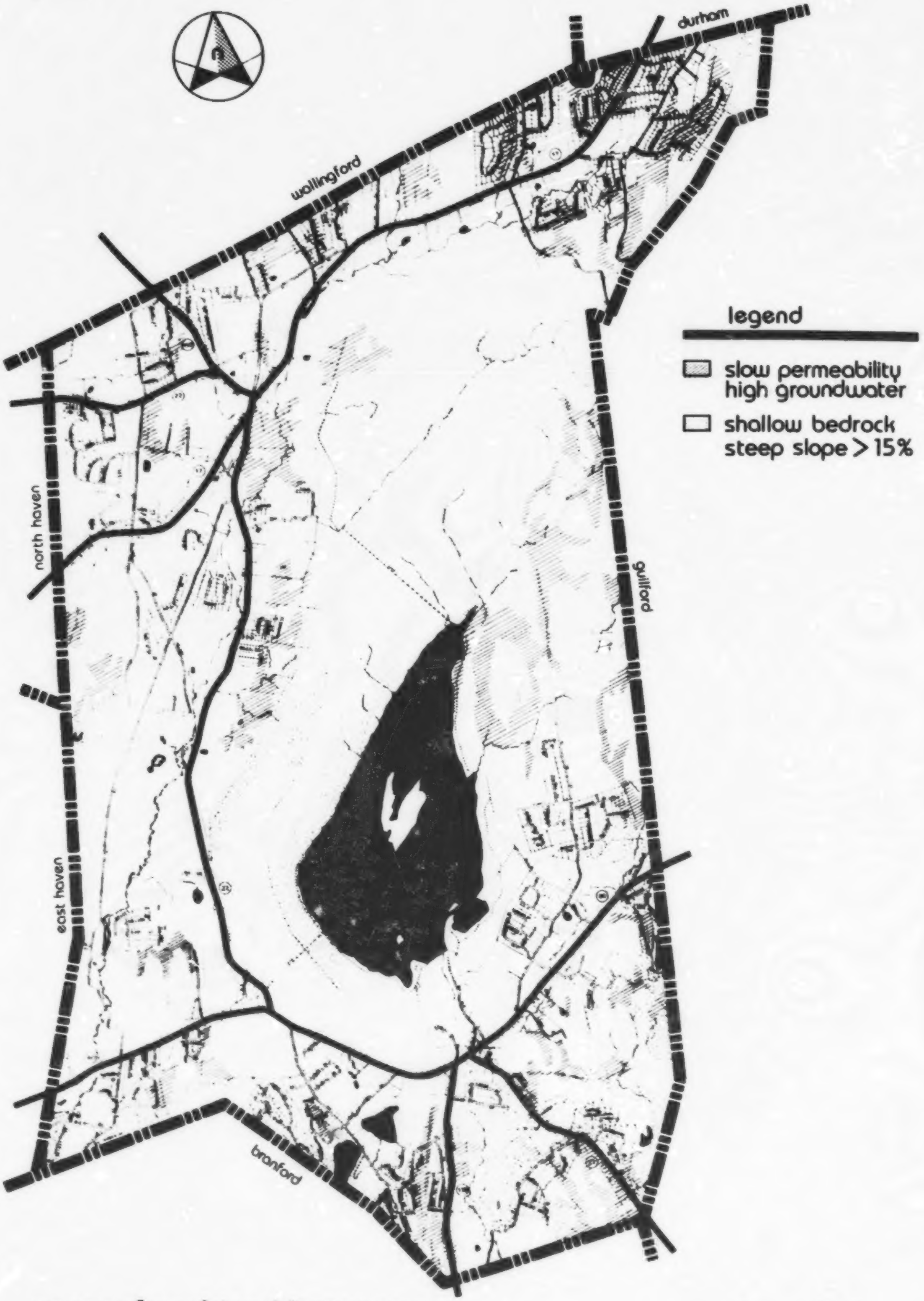
source: soil conservation service

0 1600 3200

environmental impact statement ■ environmental protection agency

anderson-nichols & co., inc.

technical consultant


durham
wallingford
north haven
east haven
guilford
branford
legend
▨ slow permeability high groundwater
☐ shallow bedrock steep slope > 15%

areas of combined limitations

figure D-5

north branford wastewater treatment facilities

date: february 1979

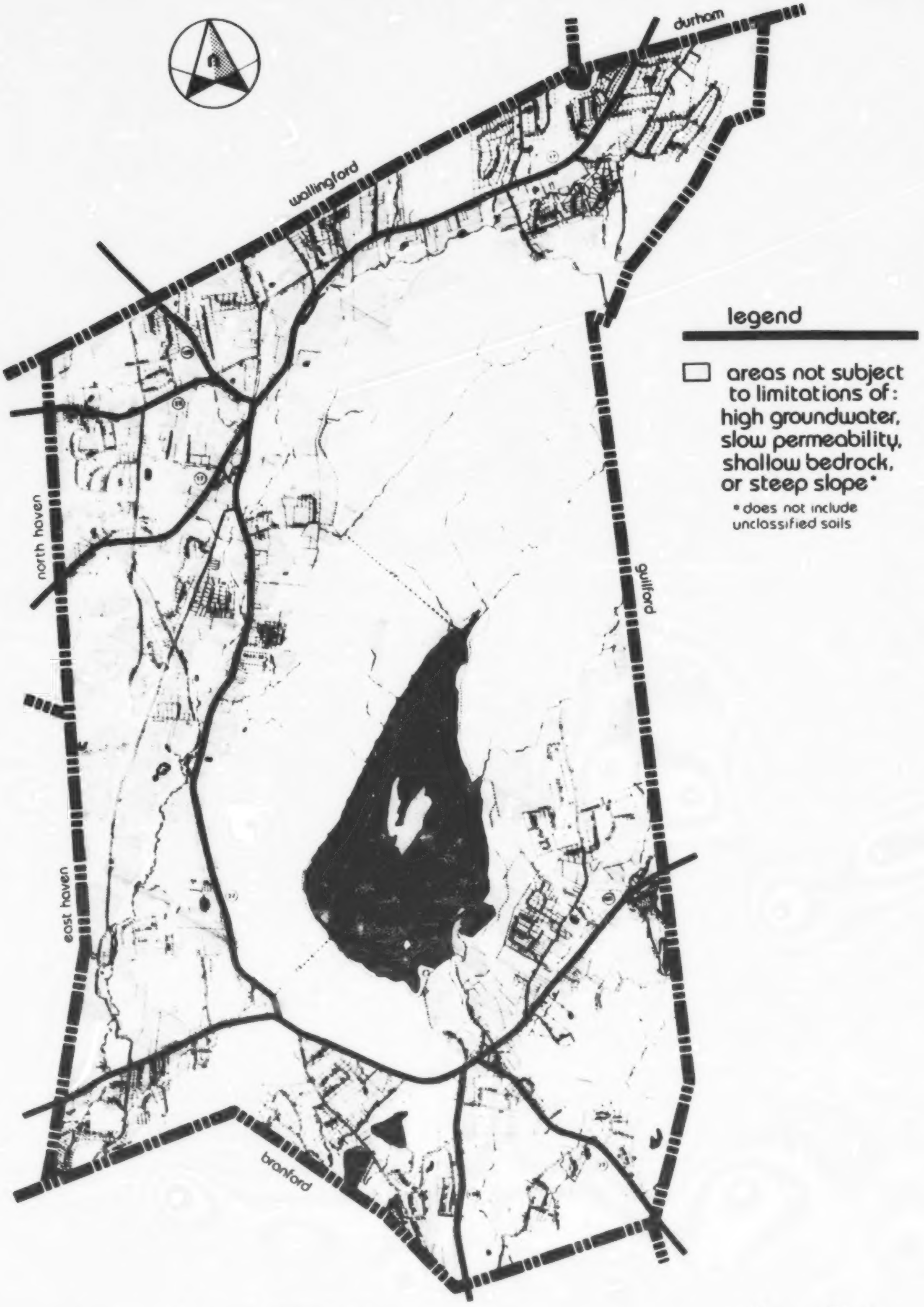
source: soil conservation service

0 1600 3200

environmental impact statement ■ environmental protection agency

anderson-nichols & co., inc.

technical consultant


durham
wallingford
north haven
east haven
branford
guilford
legend
☐ areas not subject to limitations of: high groundwater, slow permeability, shallow bedrock, or steep slope*
* does not include unclassified soils

areas with few limitations

figureD-6

north branford wastewater treatment facilities

date: february 1979

source: soil conservation service

0 1600 3200

environmental impact statement ■ environmental protection agency

anderson-nichols & co., inc.

technical consultant

## D.23 Public Workshop

During the first EIS public workshop held on January 16, 1978, participants indicated that three problem areas existed: Arthur Court, Green Acres and White Hollow (the northeastern portion of Town).

## D.24 Review of Local Records

A review of the history of on-site disposal in North Branford indicates that prior to July 1974, there was little effective control over the installation of septic systems. In July 1974, the East Shore District Health Department took over the management of on-site disposal. Town records of on-site systems are dated no earlier than 1960 and contain only sketchy information (a random sampling of records indicated that very few contained percolation test results and the few that did had rates ranging from 20 minutes per inch to 40 minutes per inch).

Between July 1974 and February 1978, ESDHD has issued permits for the repair of 88 septic systems and the installation of 180 new septic systems. This is equivalent to an average annual repair rate of less than 1% per year and an average annual septic system growth rate of approximately 2% per year.

## D.25 Questionnaire Survey

Approximately 3,800 questionnaires were sent to families in North Branford (almost 700 of the total were sent to families within the non-EIS study area, thus the response rate is based on 3,100 questionnaires). A total of 557 questionnaires were returned, for a response rate of approximately 18%. The following profile can be drawn from the questionnaire response:

- 96.1% of the respondents were homeowners
- the average residency is 12 years

-- 33% of respondents have lived in Town 5 years or less

-- 50% have lived in Town 10 years or less

-- the average family size of respondents is 3.5 people

-- 26% had two member families

-- 16% had three member families

-- 29% had four member families

-- 16% had five member families

-- 92% of the respondents have septic systems

The following table summarizes the responses to some of the questions in the survey. The numbers indicate the precentage of respondents.

TABLE D-1

Summary of Responses

| QUESTION | ANSWERS | | |
|---|---|---|---|
| | YES | NO | NO ANS. |
| Have you had your wastewater system repaired or modified? | 34.5 | 62.8 | 2.7 |
| If yes, has the repair or modification solved your problem? | 75.0 | 20.8 | 4.2 |
| What do you do to prevent problems? | | | |
| Conserve water | 58.5 | 26.4 | 15.1 |
| Keep grease out of drains | 82.6 | 9.7 | 7.7 |
| Use chemical additives | 17.2 | 64.8 | 18.0 |
| Have the system pumped | 64.1 | 21.9 | 14.0 |

TABLE D-1 (Cont'd)

| QUESTION | ANSWERS YES | NO | NO. ANS. |
|---|---|---|---|
| If yes, how often | 75% no more than once every two years. | | |
| Are you confident that these actions work? | 60.1 | 20.1 | 19.8 |
| Do you feel that your present disposal system is a problem? | 23.0 | 75.0 | 2.0 |
| Would you be willing to take special measures to prevent disposal system problems if you knew that they would work? | 67.0 | 12.4 | 20.6 |
| Do you think your neighbors are having problems with their wastewater disposal systems? | 42.9 | 45.4 | 11.7 |
| Do you think that there is a water pollution problem in your neighborhood? | 24.2 | 67.7 | 8.1 |
| Do you think sewers are needed in your neighborhood? | 37.5 | 55.1 | 7.4 |
| Do you think sewers are needed Town-wide? | 36.8 | 46.9 | 16.3 |
| Do you feel that there are alternatives to sewer construction which could be used in North Branford? | 36.1 | 34.8 | 29.1 |

Based on the Town-wide analysis, the wastewater disposal problem is not overwhelming; only 23% of the respondents feel that their present disposal system is a problem. To pursue this further, the responses were analyzed on a neighborhood basis and the results indicate the following problem areas (i.e., at least 50% of the respondents indicating problems with their on-site system):

-- Arthur Court neighborhood

-- White Hollow

-- Green Acres

-- Surrey Drive

-- Brook Lane

-- Jerz Lane

-- Miller Road/Grant Drive

## D.26 Field Surveys

A number of informal field surveys were conducted, at one time or another, by all the individuals involved in the preparation of this EIS. In addition, two formal surveys were conducted as a follow-up to the determination of problem areas by analysis of questionnaire responses. The first formal survey was conducted by the EIS team engineer to establish the feasibility of on-site repairs in the problem areas. The results of this survey indicate that except in the small lot neighborhoods (Arthur Court, for example) on-site repairs could be made. The survey also indicated some basic problems with on-site disposal in North Branford resulting from a lack of knowledge of the part of the homeowner as to his waste disposal system's location.

A second, independent survey was conducted by Connecticut Department of Environmental Protection field engineers to verify the existence of wastewater disposal problems in the designated problem areas. This was accomplished by requesting a survey of a number of streets in North Branford (these streets were located in designated problem areas and non-problem areas). This survey verified the determination of problem areas.

## D.27 Water Quality Analysis

The findings of the water quality survey and analysis (see Appendix E) support the determination of problems to the degree that the highest coliform counts are coincident with these areas.

## D.3 Analysis of Findings

### D.31 Methodology

The presentation of the findings of the determination of wastewater disposal problem areas hints at a number of recurring problem areas. The methodology involved in the analysis of the findings relied on correlation of all the data to result in final determination.

### D.32 Frame of Reference

Recent studies[1] of the failure of on-site wastewater disposal systems indicate that the failure rate of residential septic systems (as reflected by the repair rate) increases as the system's age, and then once a certain age (half-life) is attained, the failure rate decreases. Further, there exist a number of factors that affect the half-life (average life) of a group of systems. These factors include:

- -- Soil conditions, such as depth to groundwater or impermeable layer and soil type.
- -- Size of leaching area relative to family size and water use.
- -- Installation procedures and level of effort involved in inspection by regulatory agency.
- -- Care and maintenance of the system.

### D.33 Analysis

A comparison of the location of problem areas as determined by the previous studies, public workshop and questionnaire survey with soil conditions as determined by SCS result in no single soil condition associated with problems. For example:

- -- the Arthur Court neighborhood has unclassified soils, but from the field survey it showed this area is wet.

---

[1] See "Longevity of Septic Systems in Connecticut Soils," D.E. Hill and C.R. Frink; Bulletin 747, Conn. Agricultural Experiment Station; "Predicting Septic System Failures," G.B. Saxton and J.M. Zeneski, Unpublished Monograph, ANCo.

- The White Hollow area is, in part, unclassified, but a portion has high groundwater, slow permeability and steep slopes.

- The Green Acres area is unclassified.

- Surrey Drive is shallow to bedrock.

- Brook Lane has high groundwater and slow permeability.

- Jerz Lane is, in part, unclassified, but the field survey indicates that it is a wet area.

- The Miller Road/Grant Drive neighborhood is, in part, unclassified and, in part, wet with slowly permeable soils.

- Dorie Drive has high groundwater.

Thus, the wastewater disposal problem in North Branford can be explained, in part, by soil conditions. It is noted that a good portion of Town, see Figure D-6, has no SCS constraints on on-site disposal, however, these lands are still vacant (used for farming) and will only affect future wastewater disposal for new developments.

The review of the Town's records on on-site disposal and conversations with long-time Town residents indicate that until the East Shore District Health Department became the regulatory agency for on-site disposal in North Branford, the level of effort involved in the inspection of septic system installation was minimal. This, in part, explains the wastewater disposal problem in Town and bodes well for on-site disposal for new development. Further State Health Department regulations for on-site were modified and improved in 1970 so that new systems are being designed at a more reasonable size.

The questionnaire survey of Town residents indicates that almost two-thirds of the respondents are maintaining their on-site systems through periodic pumping. There remains, however, a number of new residents (perhaps moving from urban areas to North Branford) who have never used an on-site disposal system and know very little about the system's care or maintenance. This, in part, explains the wastewater disposal problem.

## D.34 Conclusions

The history of on-site disposal in North Branford has led to a number of wastewater disposal problems that have resulted in unsanitary conditions in some cases and effects on surface water quality in other cases. The wastewater disposal problem is not Town-wide, but is found in isolated parts of Town. The problem is due to the poorly supervised installation of probably inadequate systems in areas with soil conditions that require special consideration. The problem has been addressed on many fronts, the State has promulgated new regulations, the regulatory functions have been shifted to a regional agency and the Town has built or proposed to build sewers in problem areas. The response to this problem and future problems is not sewers in all cases. Future problems can be avoided by properly installing adequate systems in good locations and educating the homeowner as to the proper care and maintenance of an on-site disposal system. Existing problem areas can be served by a number of alternatives that include:

-- continued use of on-site disposal with appropriate repairs and rehabilitations.

-- communal or shared treatment/disposal systems.

-- limited sewer systems.

Not all of these alternatives are suitable for all problem areas, specifically, continued on-site disposal is not suitable for the Foxon section including Arthur Court. Dorie Drive, and Brook Lane/Sunset Road.

In summary, the problem areas as determined by the procedures and methods described above are in Section B: Brook Lane/Sunset Road, Arthur Court, Dorie Drive, Jerz Lane and Miller/Grant Road; in Section C: Surrey Drive, Green Acres and White Hollow.

# APPENDIX E

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E-1a

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